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LAMB MULTIBURST CALCULATIONS FOR VARIOUS ATTACK SCENARIOS.(U)
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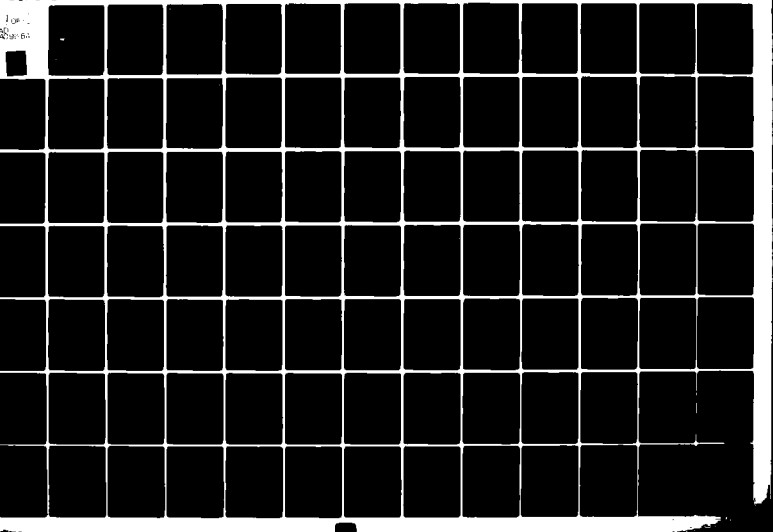

LAMB MULTIBURST CALCULATIONS FOR VARIOUS ATTACK SCENARIOS

H. J. Abeyta
Capt W. E. Gifford, III
J. W. Aubrey

May 1980

Final Report

Approved for public release; distribution unlimited.

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AIR FORCE WEAPONS LABORATORY
Air Force Systems Command
Kirtland Air Force Base, NM 87117

A

This final report was prepared by the Air Force Weapons Laboratory, Kirtland Air Force Base, New Mexico, under Job Order WDNB4405. Mr James W. Aubrey (NTESB) was the Laboratory Project Officer-in-Charge.

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JAMES W. AUBREY
Project Officer

FOR THE DIRECTOR

GARY P. GANONG
Lt Colonel, USAF
Chief, Technology and Applications Br

STEWART W. JOHNSON
Lt Colonel, USAF
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19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

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Multiburst	Shock
Overpressure	Nuclear
Overpressure Impulse	

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report contains the results of 33 Low Altitude Multiburst (LAMB) calculations. These calculations provide overpressure and overpressure impulse time histories, as well as shock front velocities for 12 multiburst attack scenarios. Yields of 1, 3, and 5 Mt were used in these calculations, with shelter spacing of 1000, 1500, or 2000 m.

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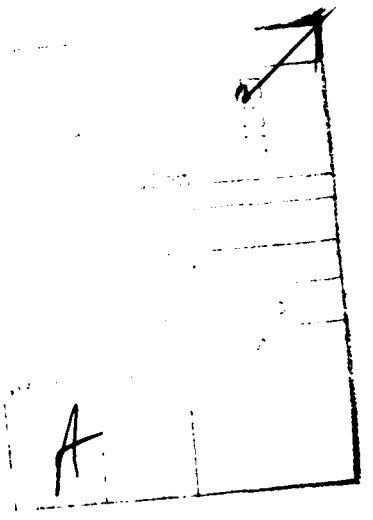
CONTENTS



INTRODUCTION

This report consists of 33 LAMB calculations (Table 1) and a description of the data. It was written to provide overpressure and overpressure impluse-time histories as well as shock front velocities for various multiburst scenarios. The Air Force Weapons Laboratory LAMB code was used because of its fast computation running time and economy.

TABLE 1. MULTIBURST PROBLEM MATRIX

Problem		RV/Shelter Attack	Yield	HOB	Spacing	PEAKS PRES (MPa)	PEAKS IMP (MPa-s)
1	33.1012	1/2(a)	3 Mt	0 m	1500 m	3.5	2.4
2	33.1122	1/2(b)	3 Mt	0 m	1500 m	7.6	1.9
3	33.1232	1/2(c)	3 Mt	0 m	1500 m	3.6	2.5
4	33.1142	1/2(d)	3 Mt	0 m	1500 m	7.6	1.8
5	33.8001	1/3	3 Mt	0 m	1000 m	18.	2.8
6	33.8002	1/3	3 Mt	0 m	1500 m	4.8	1.3
7	33.8003	1/3	3 Mt	0 m	2000 m	2.0	0.7
8	53.8001	1/3	5 Mt	0 m	1000 m	30.	4.7
9	53.8002	1/3	5 Mt	0 m	1500 m	7.8	2.1
10	53.8003	1/3	5 Mt	0 m	2000 m	3.2	1.2
11	33.8012	1/3(a)	3 Mt	0 m	1500 m	4.8	1.4
12	53.8012	1/3(a)	5 Mt	0 m	1500 m	7.8	2.2
13	33.8032	1/3(c)	3 Mt	0 m	1500 m	2.3	1.4
14	53.8032	1/3(c)	5 Mt	0 m	1500 m	3.8	2.5
15	33.1201	1/3(e)	3 Mt	0 m	1000 m	9.3	4.6
16	33.1202	1/3(e)	3 Mt	0 m	1500 m	3.5	2.1
17	33.1203	1/3(e)	3 Mt	0 m	2000 m	1.7	1.1
18	53.1201	1/3(e)	5 Mt	0 m	1000 m	15.	8.0
19	53.1202	1/3(e)	5 Mt	0 m	1500 m	5.6	3.5
20	53.1203	1/3(e)	5 Mt	0 m	2000 m	2.7	2.0
21	53.6001	1/4	5 Mt	0 m	1000 m	15.	2.5
22	53.6002	1/4	5 Mt	0 m	1500 m	4.1	1.2
23	53.6003	1/4	5 Mt	0 m	2000 m	1.8	0.66
24	33.6011	1/4(a)	3 Mt	0 m	1000 m	9.0	1.4
25	33.6012	1/4(a)	3 Mt	0 m	1500 m	2.6	0.68
26	33.6013	1/4(a)	3 Mt	0 m	2000 m	1.1	0.34
27	53.6011	1/4(a)	5 Mt	0 m	1000 m	15.	2.2
28	53.6012	1/4(a)	5 Mt	0 m	1500 m	4.1	1.1
29	53.6013	1/4(a)	5 Mt	0 m	2000 m	1.8	0.64
30	13.1211	2/3	1 Mt	0 m	1000 m	4.8	2.2
31	13.1212	2/3	1 Mt	0 m	1500 m	2.0	1.1
32	13.1213	2/3	1 Mt	0 m	2000 m	1.0	0.64
33	13.1012	2/3(a)	1 Mt	0 m	1500 m	1.4	0.84

APPROACH

A uniform laydown of reentry vehicles (RV) over an evenly distributed system of targets (shelters) was assumed. The ratio of RV to targets was used to describe the attack laydown pattern. Thus, attack scenario 1/2 refers to an attack laydown such that there is one RV attacking each pair of shelters. The suffixes on the various scenarios (e.g., 1/2 (a)) refer to the different laydown configurations possible. Using this nomenclature, the 12 attack scenarios examined were 1/2(a), 1/2(b), 1/2(c), 1/2(d), 1/3, 1/3(a), 1/3(c), 1/3(e), 1/4, 1/4(a), 2/3 and 2/3(a) (figures are in Appendix A). Yields of 1, 3 and 5 Mt were used. Spacing between shelters was 1000, 1500, or 2000 m. Bursts were numbered sequentially as a function of increasing angle clockwise from 0° (top of page) and were detonated simultaneously at ground level.

Stations were not colocated with shelters (which tend to fall on symmetry points) for the following reasons:

1. The LAMB code underpredicts peak overpressure at symmetry points.
2. Perfect symmetry will not occur in MX construction.
3. Zero CEP is highly improbable.
4. Assuming zero CEP, simultaneous detonation and perfect symmetry are not operationally obtainable environments.

Thus, measuring overpressure-time histories at nonsymmetry points provides more realistic waveforms for physically plausable attack scenarios. Stations were placed 100 m from the shelter and 20° off a direct line between the shelter and the nearest burst (Fig. 1). Three stations were required to define overpressure and overpressure impulse-time histories for the 1/3 and 1/3(a) scenarios. One station sufficed for each of the other scenarios.

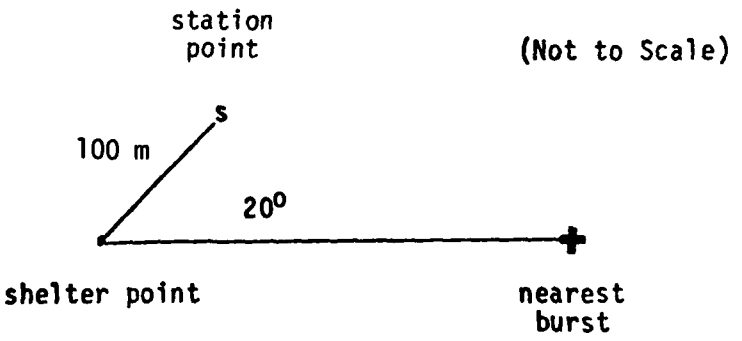


Figure 1. Shelter-station relation.

Test cases were run to determine the number of bursts to be used in each calculation. These test cases represent the worst possible attacks (for the scenarios examined) in terms of the number of bursts reaching the station point at approximately the same time. The results of the test cases (Fig. 2 through 7) show that restrictions on the number of bursts in a calculation could be made while preserving the significant overpressure-time history at the station point. All bursts which were within four closest burst-to-shelter radii of the shelter were included in the calculations for the 1/3 and 1/4 scenarios. For economy, the number of bursts was restricted to 12 for each of the other scenarios.

All the calculations were run to detonation time, plus 12 s. All of the shock waves had passed over each station by this time. The shock front velocities were computed in the following manner:

> A shock velocity function subroutine, VSHCK, was called from the LAMB code with height of burst, shock radius, height-of-station point, and yield as input parameters. The analytic expression used for shock velocity was obtained from the Rankine-Hugoniot relation:

$$U = c\left(1 + \frac{\gamma + 1}{2\gamma} \cdot \frac{\Delta P}{P}\right)^{1/2}$$

where

U = shock front velocity
c = ambient speed of sound
γ = ratio of specific heats for air
ΔP = overpressure
P = ambient pressure
γ = 1.4 was used for this case

The direction of the shock was determined by computing the angle between the burst and the station in polar coordinates.

RESULTS

Overpressure and overpressure impulse-time histories are presented in Appendix B. The number associated with each peak is the burst number. The shock arrival time (s), shock velocity (m/s), shock direction (°), burst number, and burst range (m) are presented in tabular form. The attack scenario is presented at each overpressure plot where the number corresponds to a burst point and the letter s depicts a station point (Appendix A). Shock direction is equivalent to the bearing from the burst. As it passes over the station, the shock is travelling parallel to the bearing from burst station. Burst range refers to the distance between the burst and station.

TEST CASE

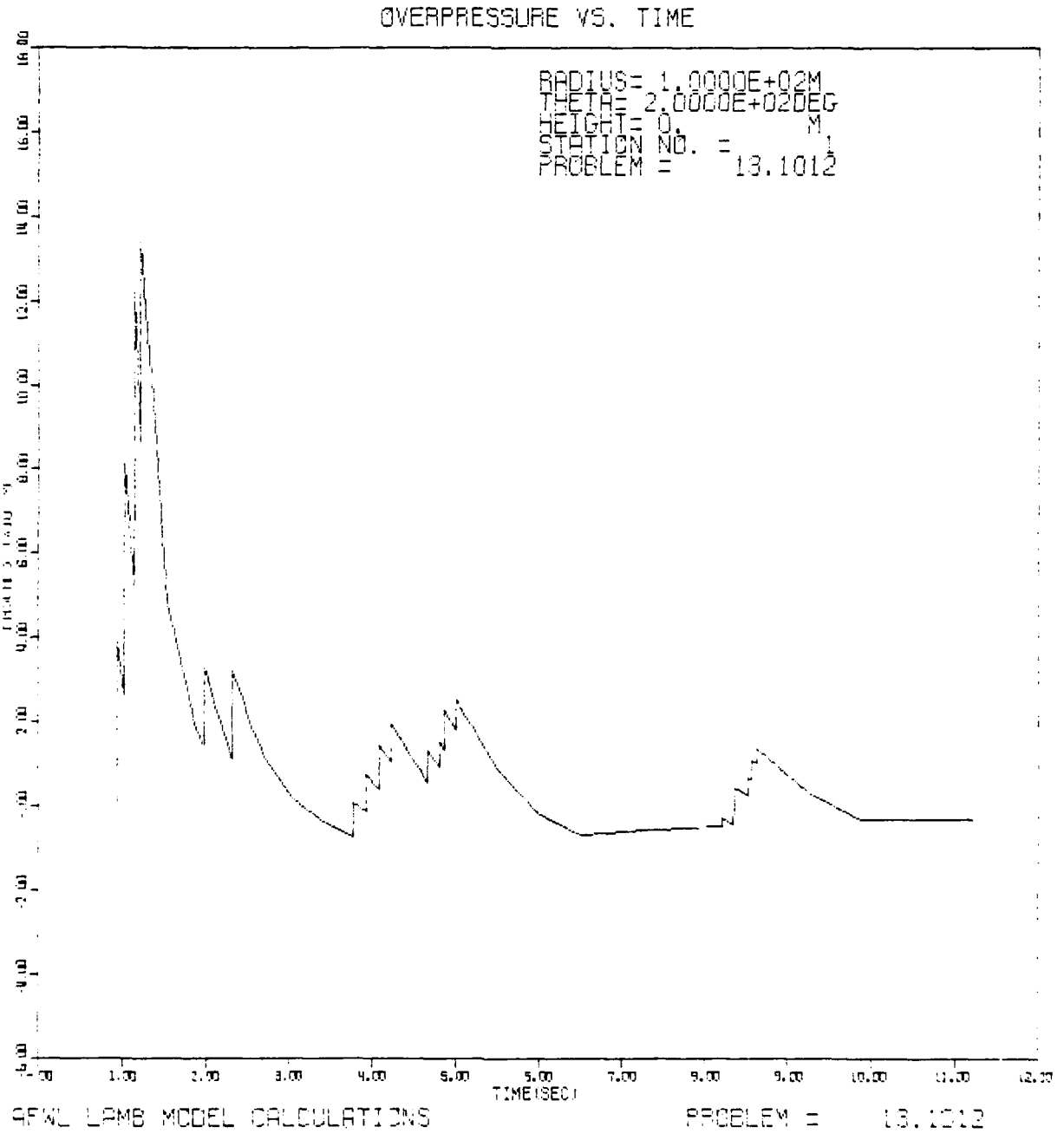


Figure 2. Overpressure versus time-2/3(a) attack (with added bursts).

TEST CASE

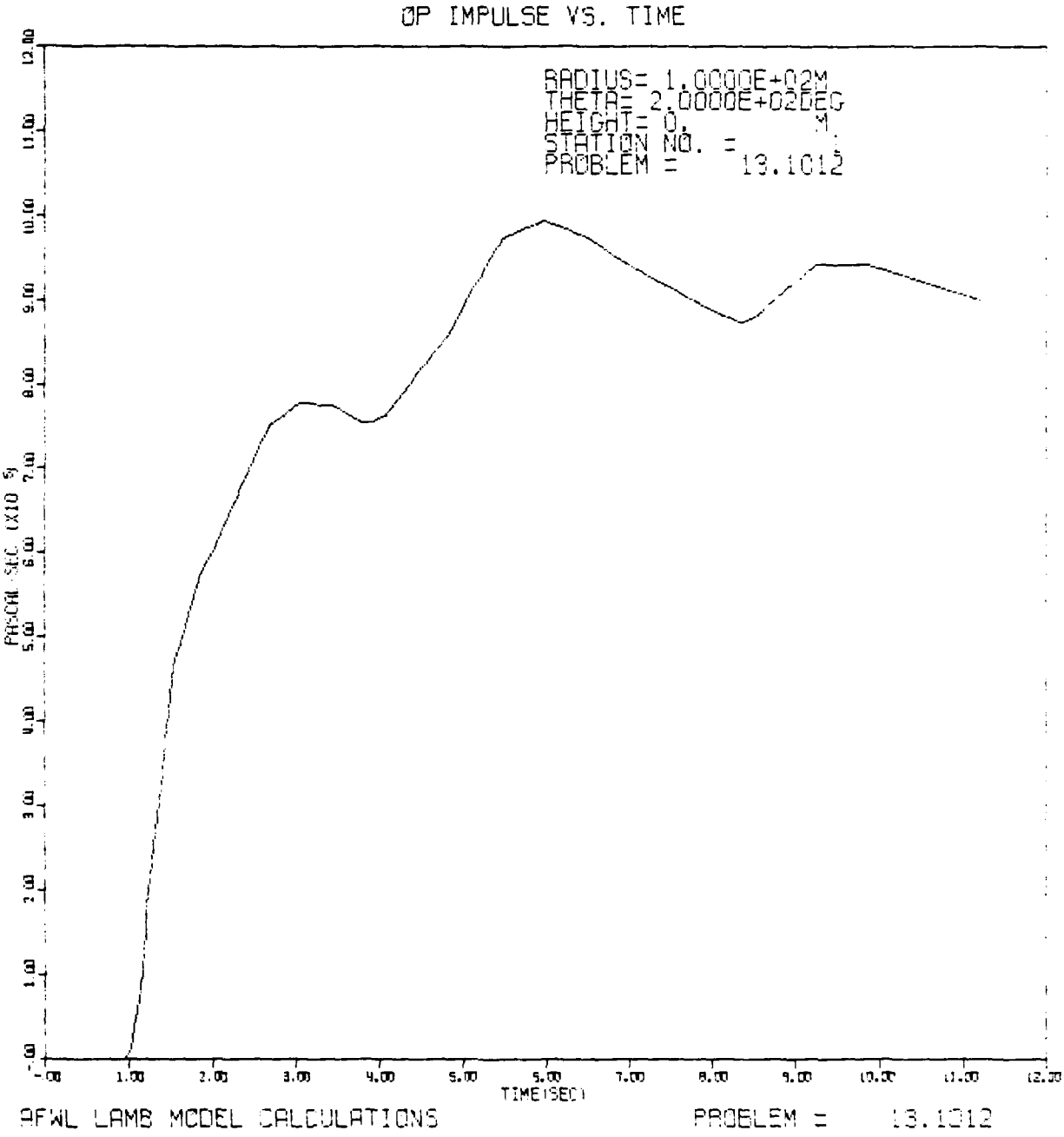


Figure 3. Overpressure pulse versus time-2/3(a) attack (with added bursts).

TEST CASE

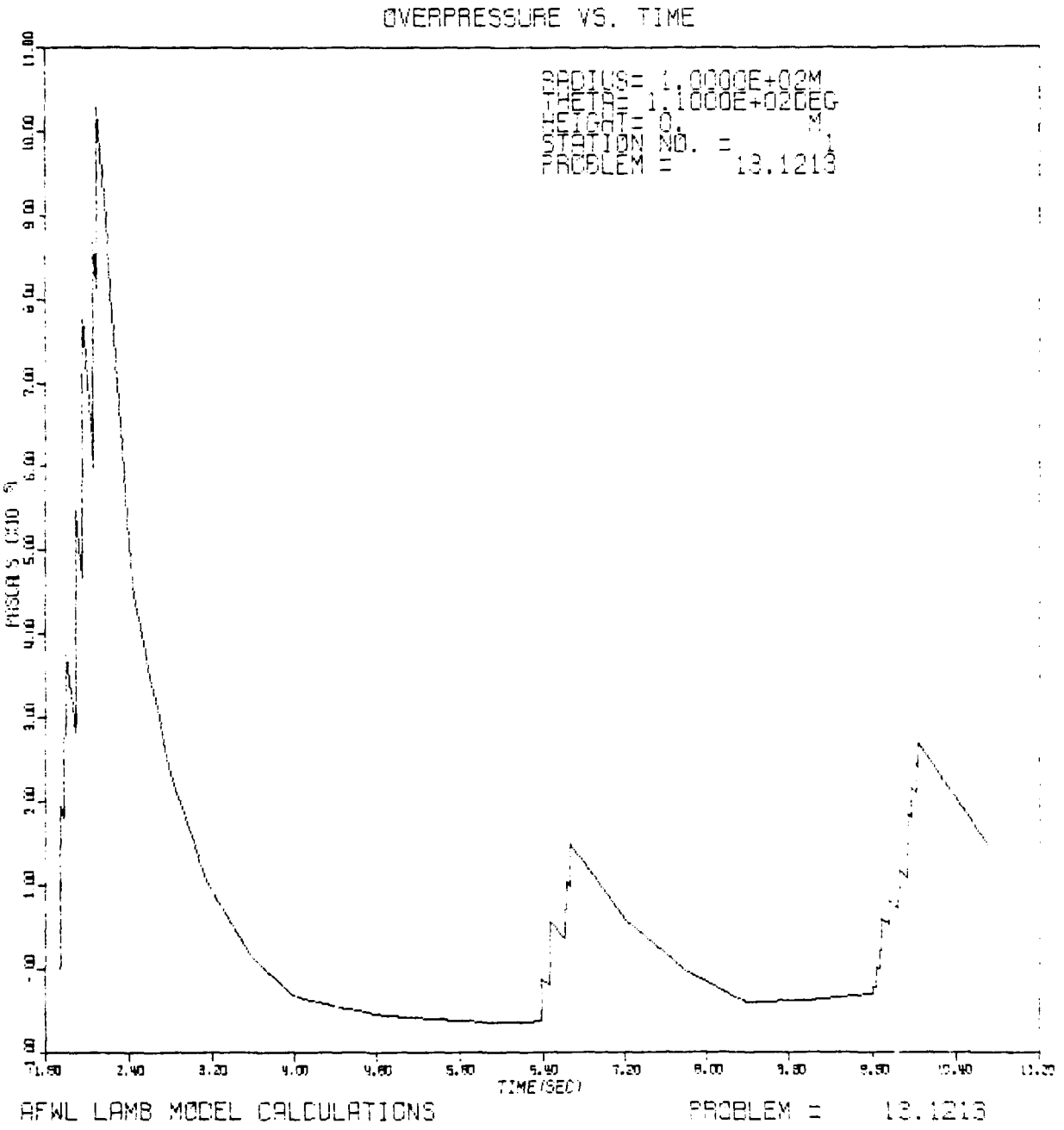


Figure 4. Overpressure versus time-2/3 attack (with added bursts).

TEST CASE

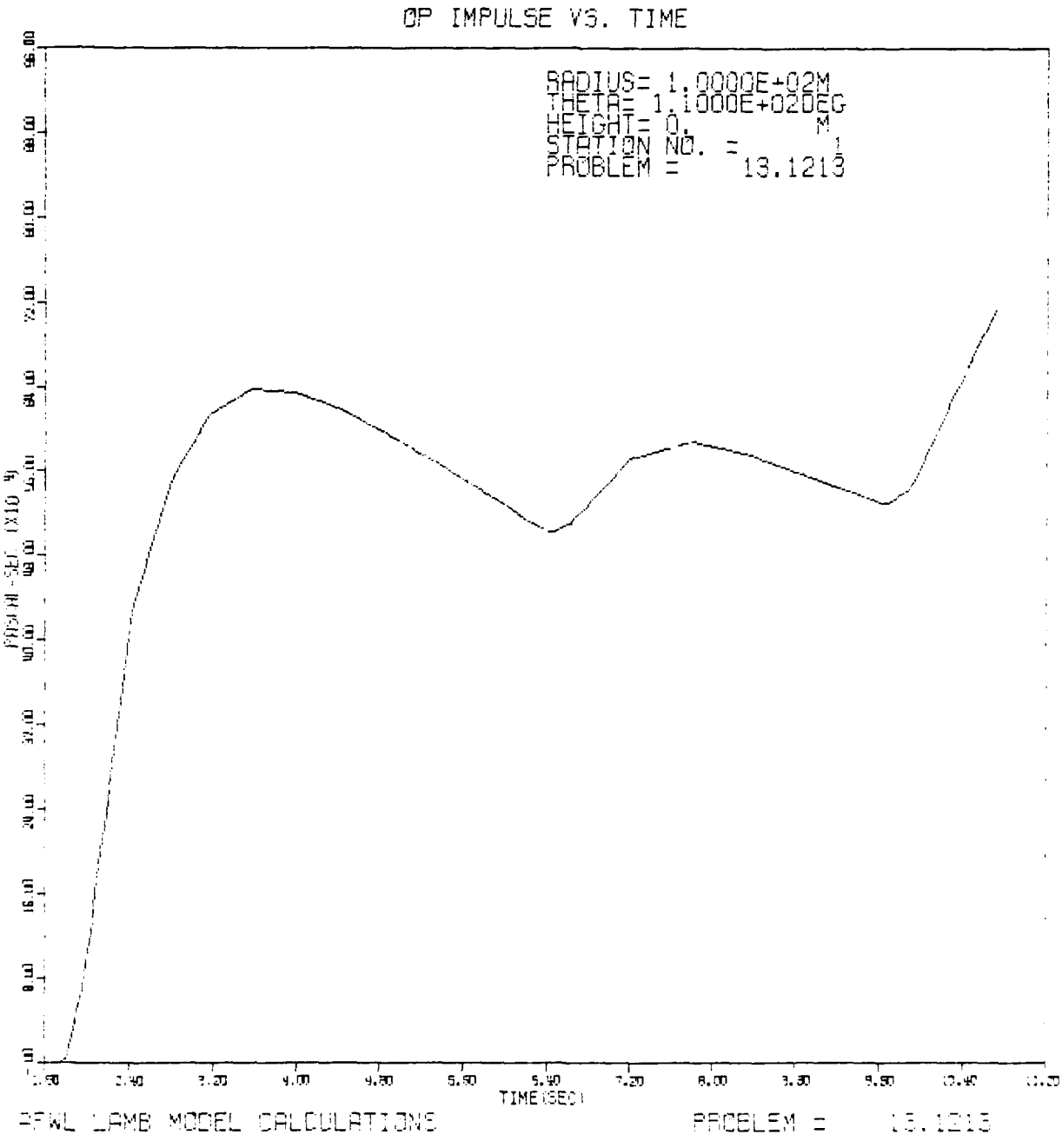


Figure 5. Overpressure impulse versus time-2/3 attack (with added bursts).

TEST CASE

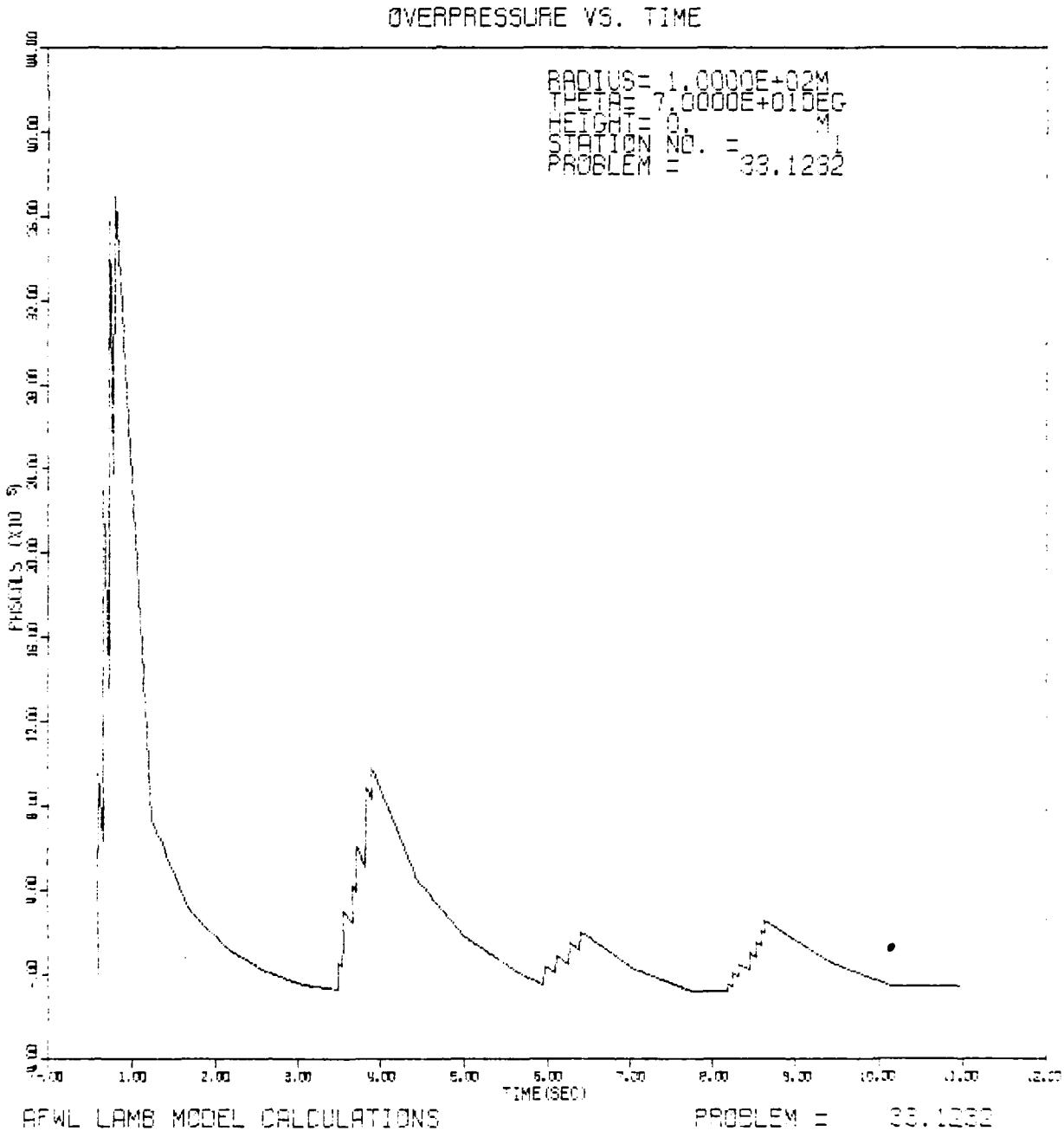


Figure 6. Overpressure versus time-1/2(c) attack (with added bursts).

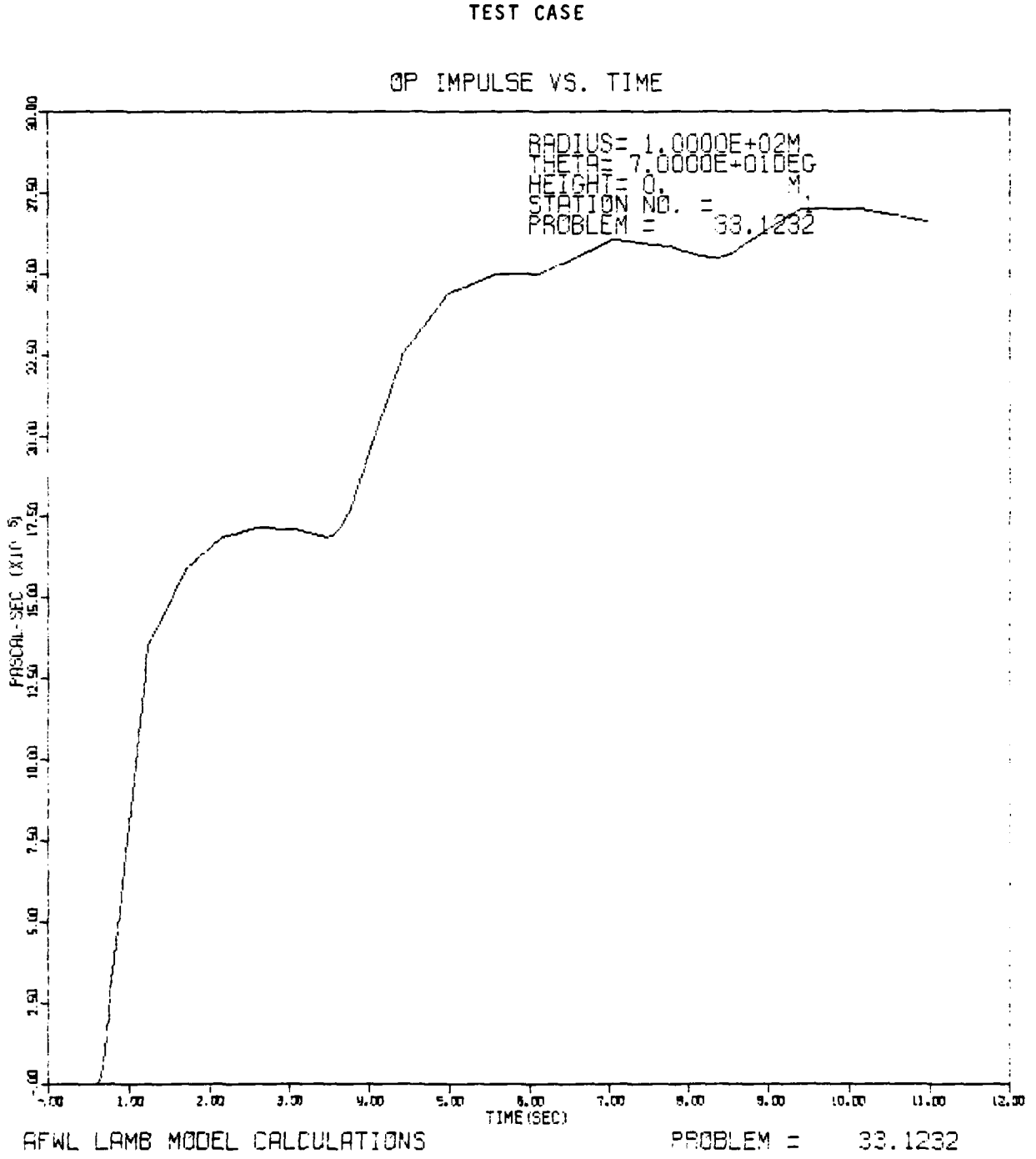


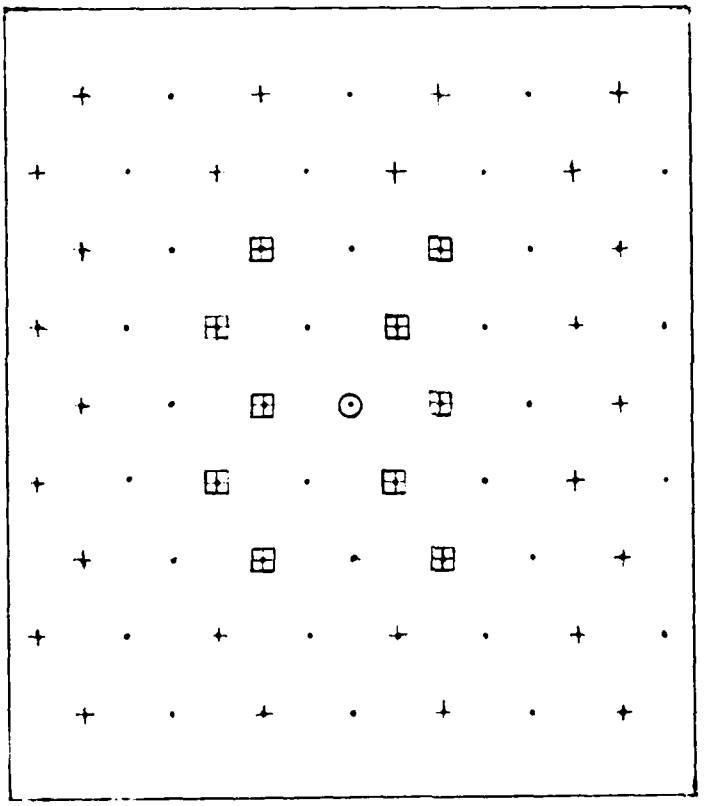
Figure 7. Overpressure impulse versus time-1/2(c) attack (with added bursts).

APPENDIX A

The following 12 figures illustrate the various attack scenarios used in this multiburst study. Included in these figures are launch points, aim points, calculational burst points and station points. The various attack scenarios are described as a ratio of RV to targets. For example, a 1/2 scenario refers to one RV attacking each pair of targets.

LEGEND:

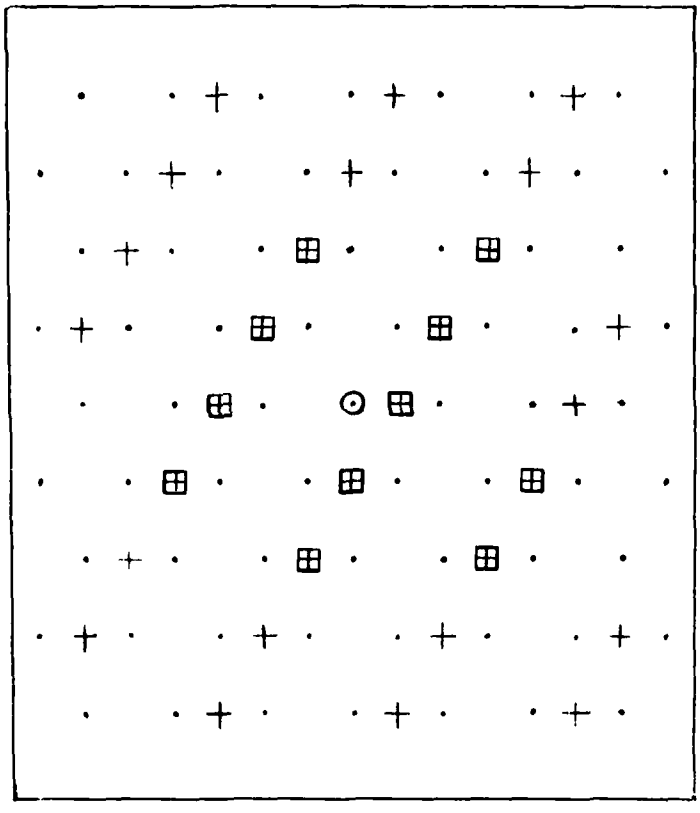
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/2(a) ATTACK

LEGEND:

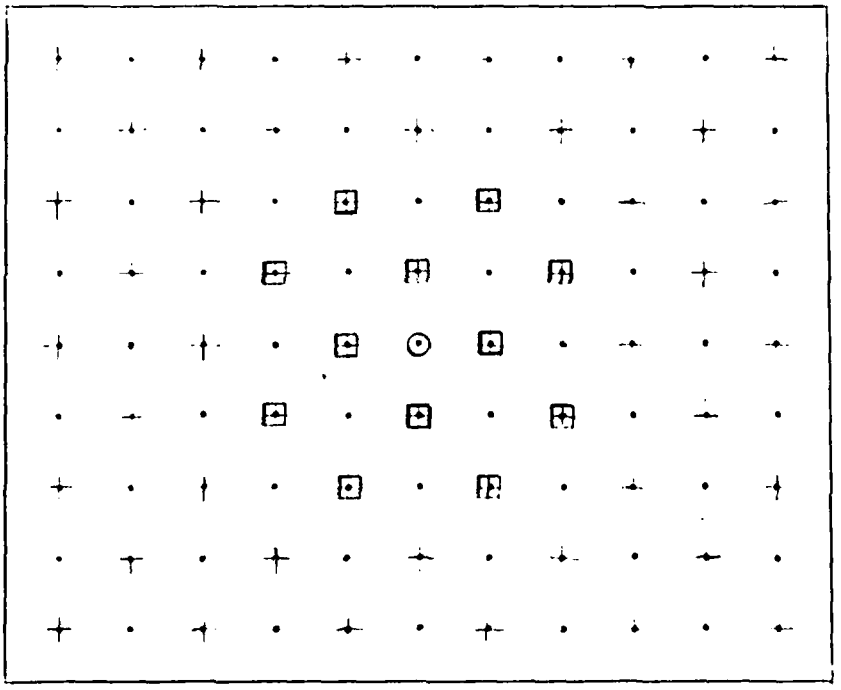
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/2(b) ATTACK

LEGEND:

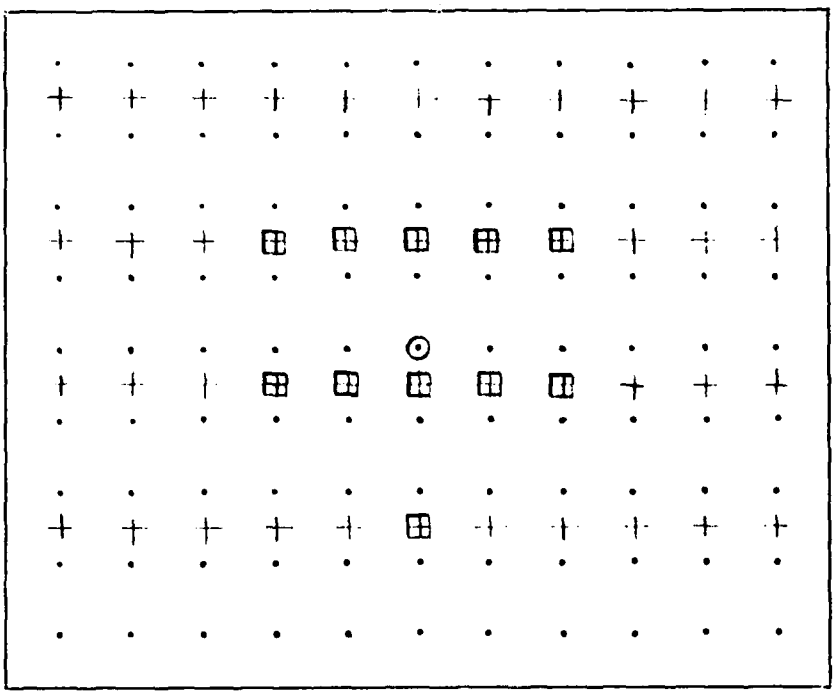
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



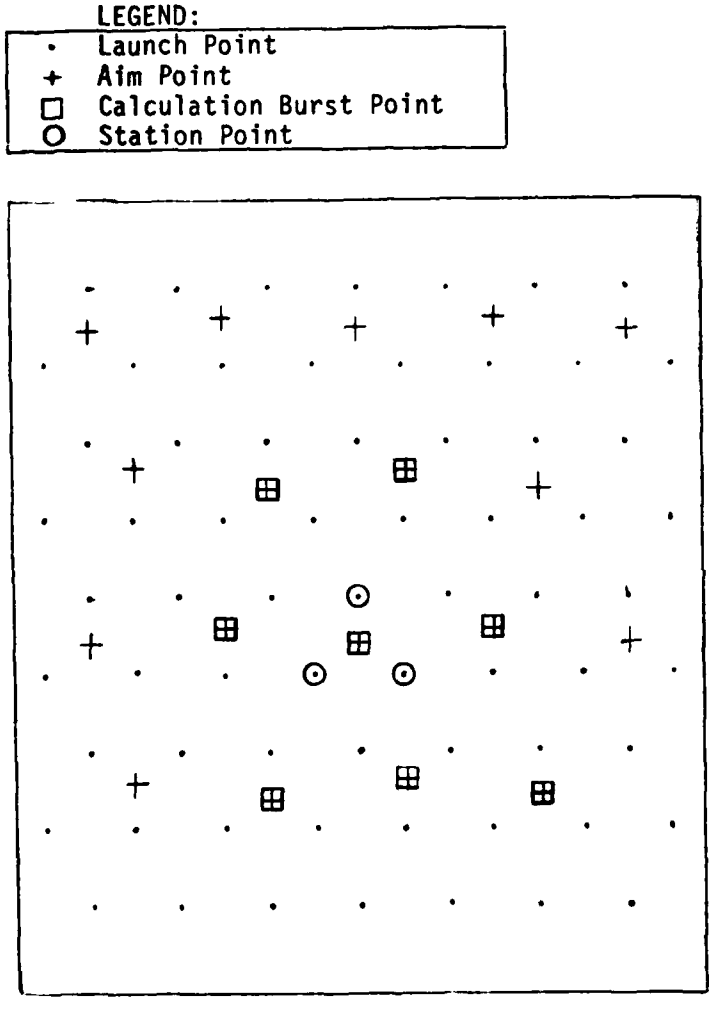
1/2(c) ATTACK

LEGEND:

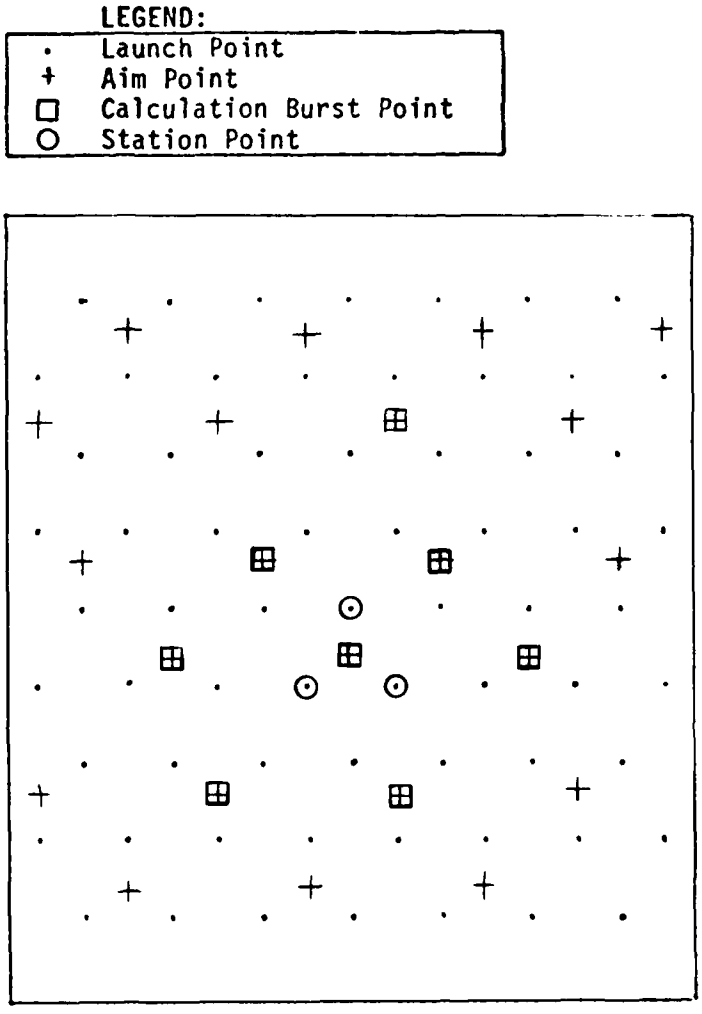
- Launch Point
- Aim Point
- Calculation Burst Point
- Station Point



1/2(d) ATTACK


LEGEND:
Launch Point
Aim Point
Calculation Burst Point
Station Point

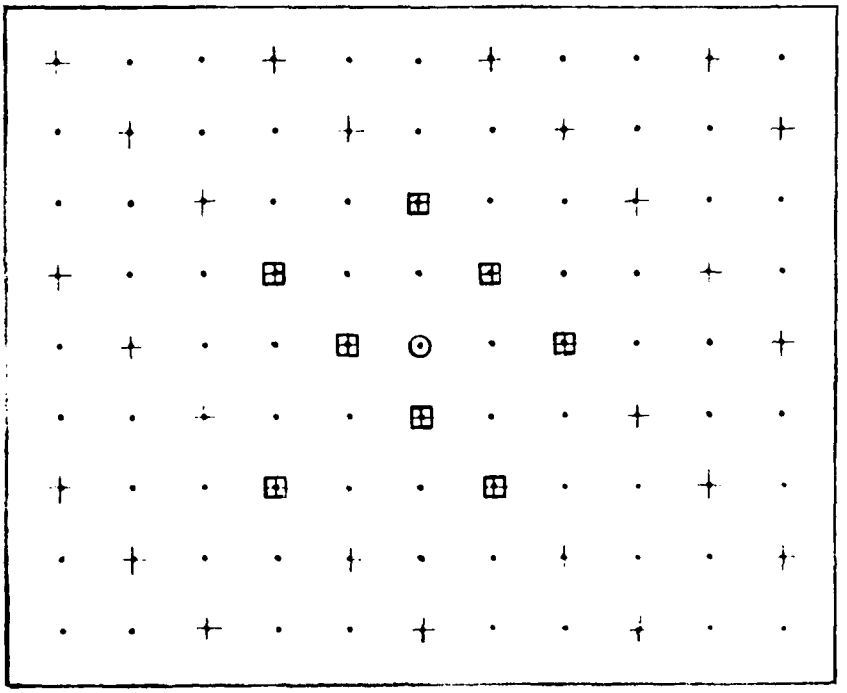
1/3 ATTACK


LEGEND:
Launch Point
Aim Point
Calculation Burst Point
Station Point

1/3(a) ATTACK

LEGEND:

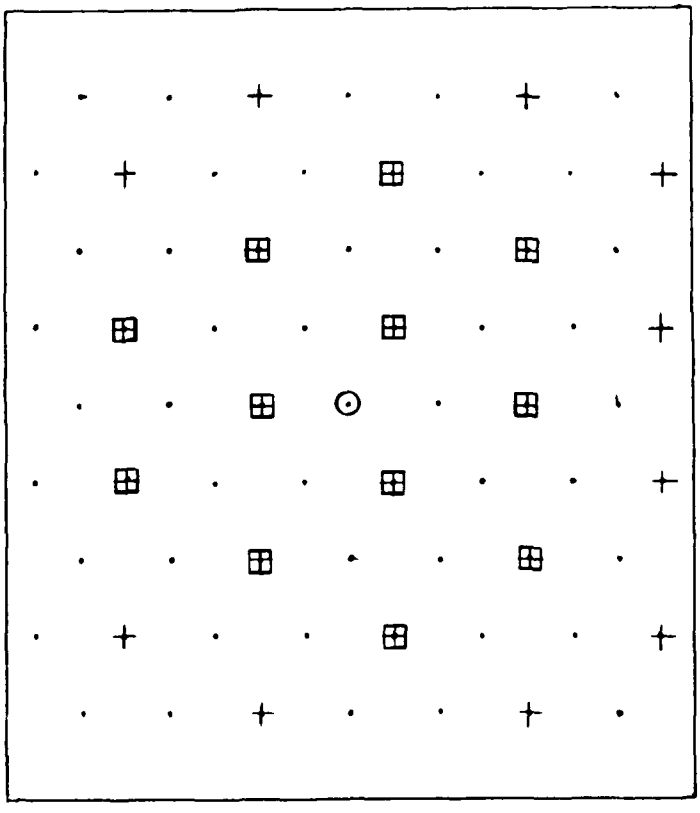
- Launch Point
- Aim Point
- Calculation Burst Point
- Station Point



1/3(c) ATTACK

LEGEND:

·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/3(e) ATTACK

LEGEND:

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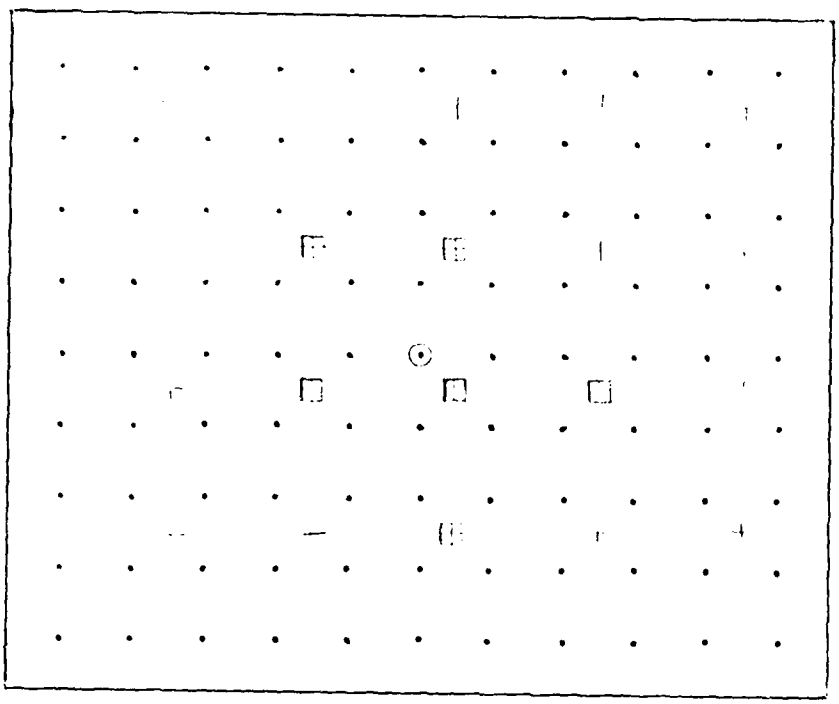
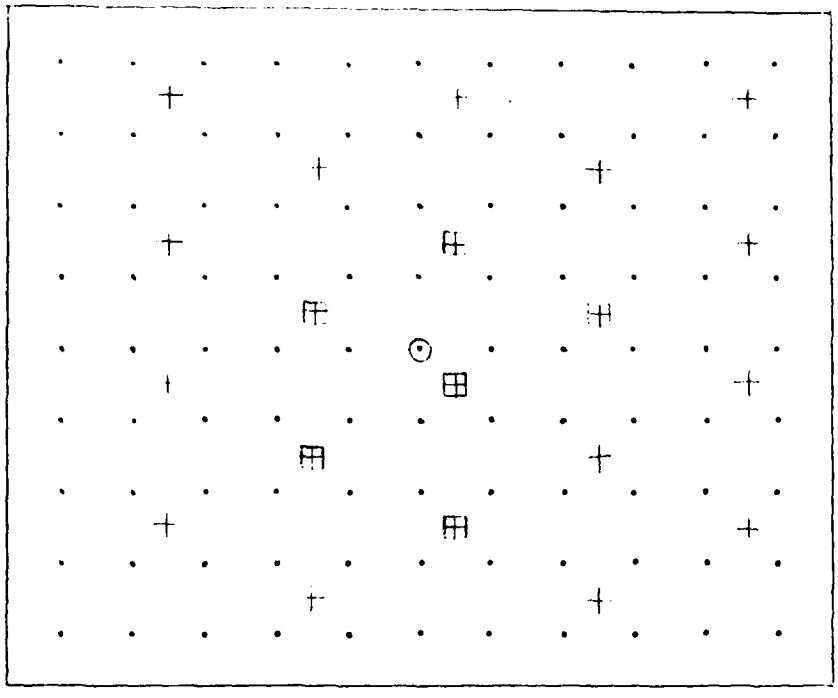
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/4 ATTACK

LEGEND:

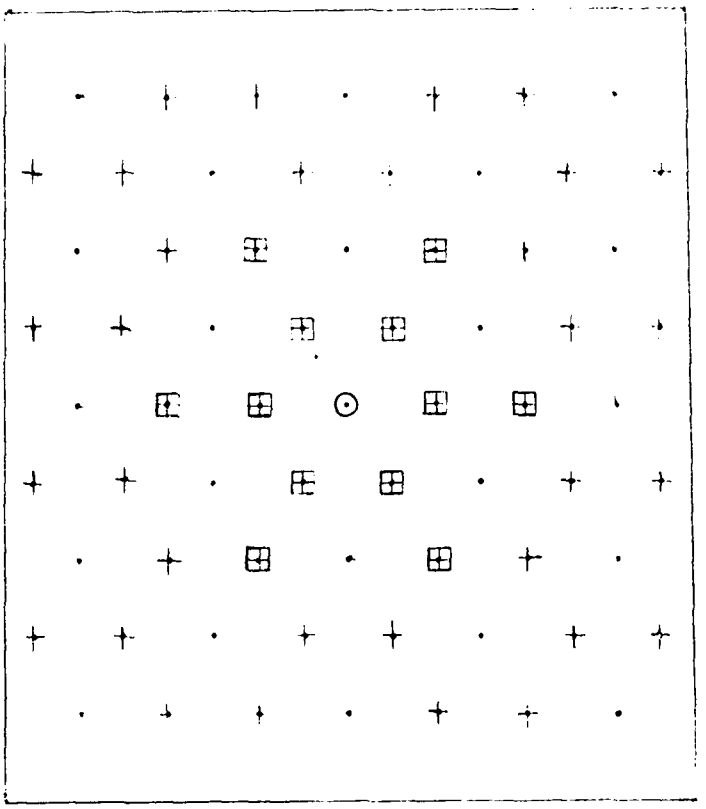
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



1/4(a) ATTACK

LEGEND:

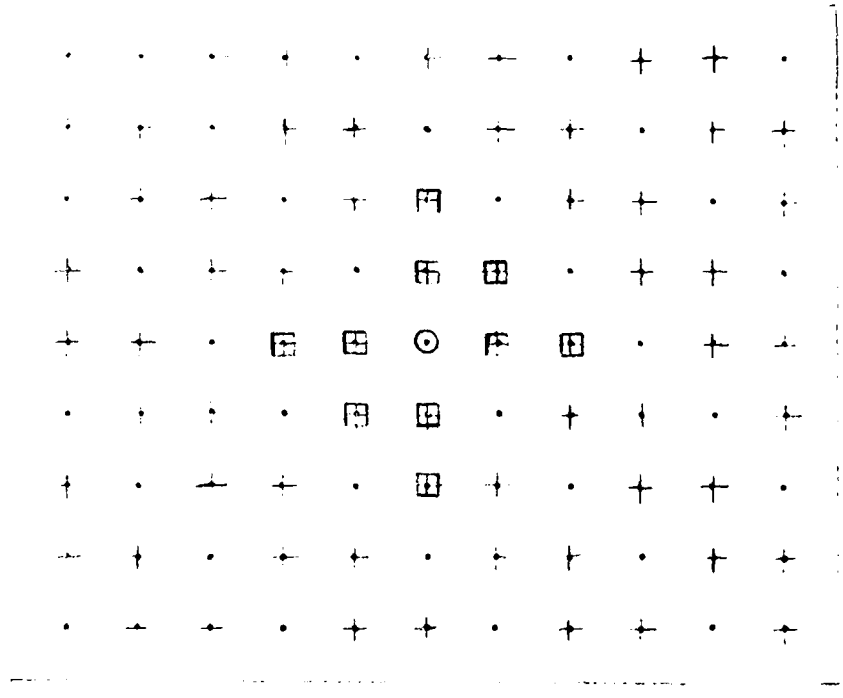
·	Launch Point
+	Aim Point
□	Calculation Burst Point
○	Station Point



2/3 ATTACK

LEGEND:

·	Launch Point
+	Aim Point
□	Calculation Burst Point
O	Station Point



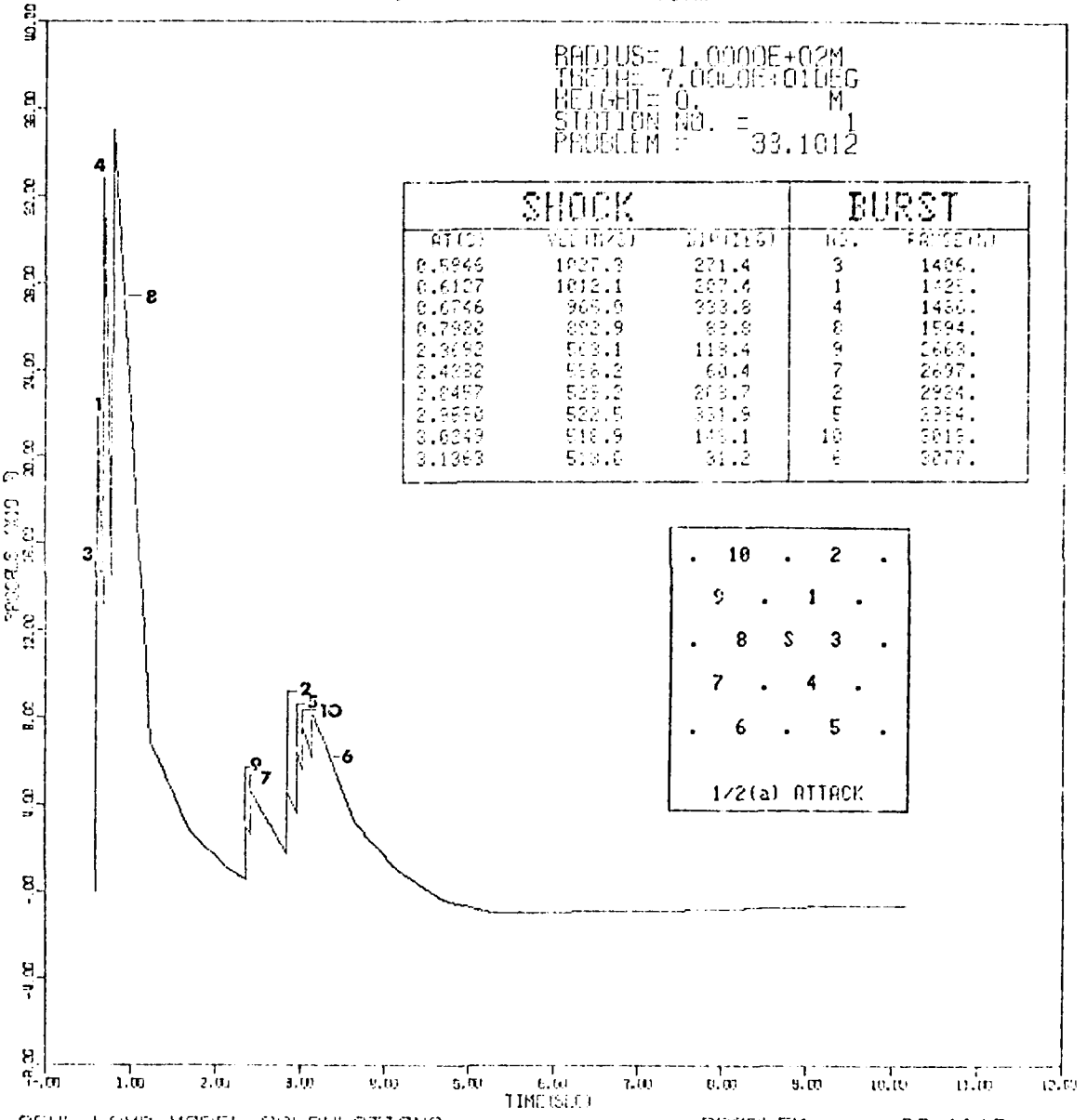
2/3(a) ATTACK

APPENDIX B

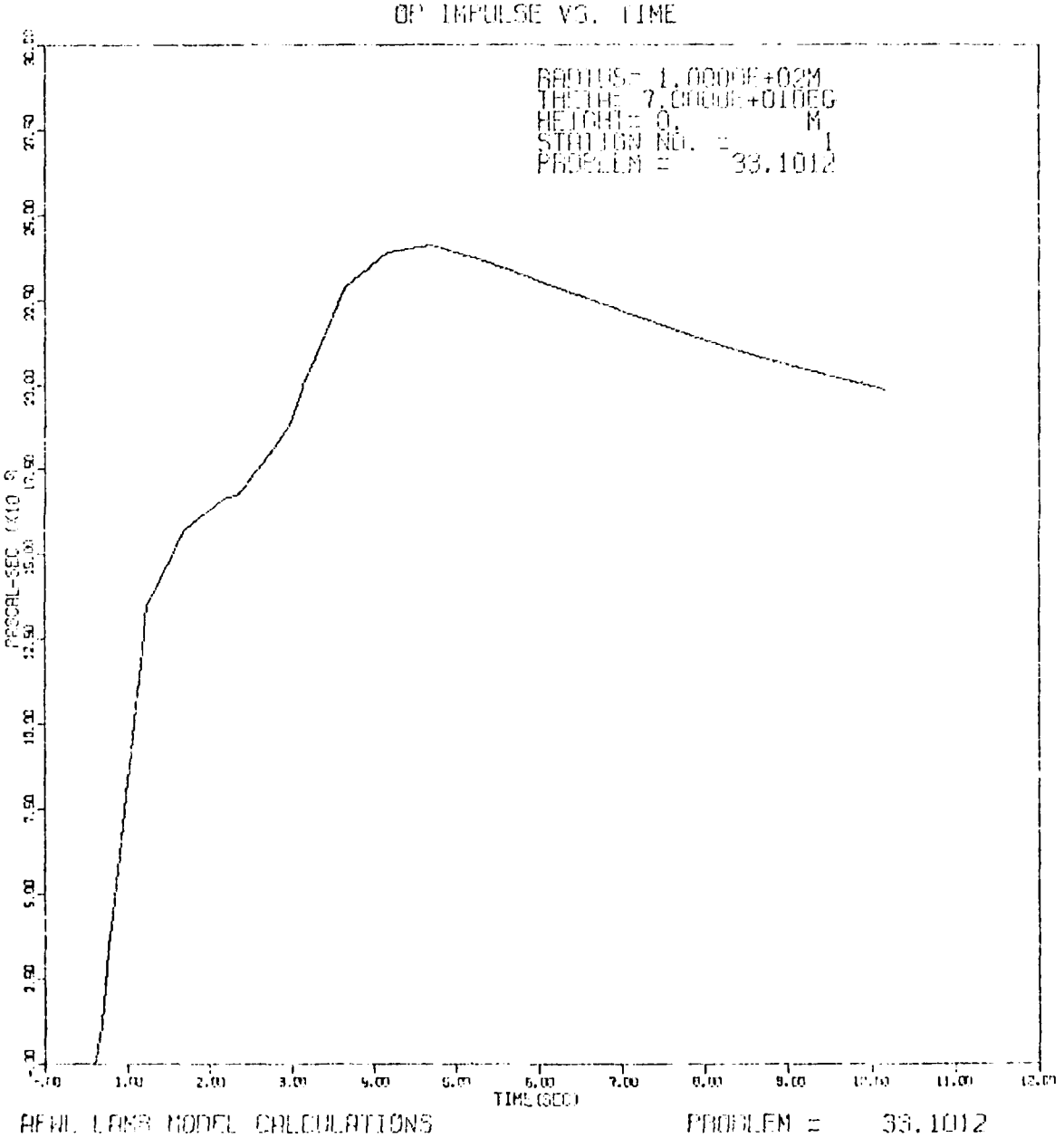
The following figures are overpressure and overpressure impulse-time histories of the various attacks described in Appendix A. The burst number associated with the overpressure peaks corresponds to the attack scenario burst number inset on each plot. In addition, the shock arrival time, shock velocity, shock direction, burst number and burst range are presented on the overpressure plots.

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

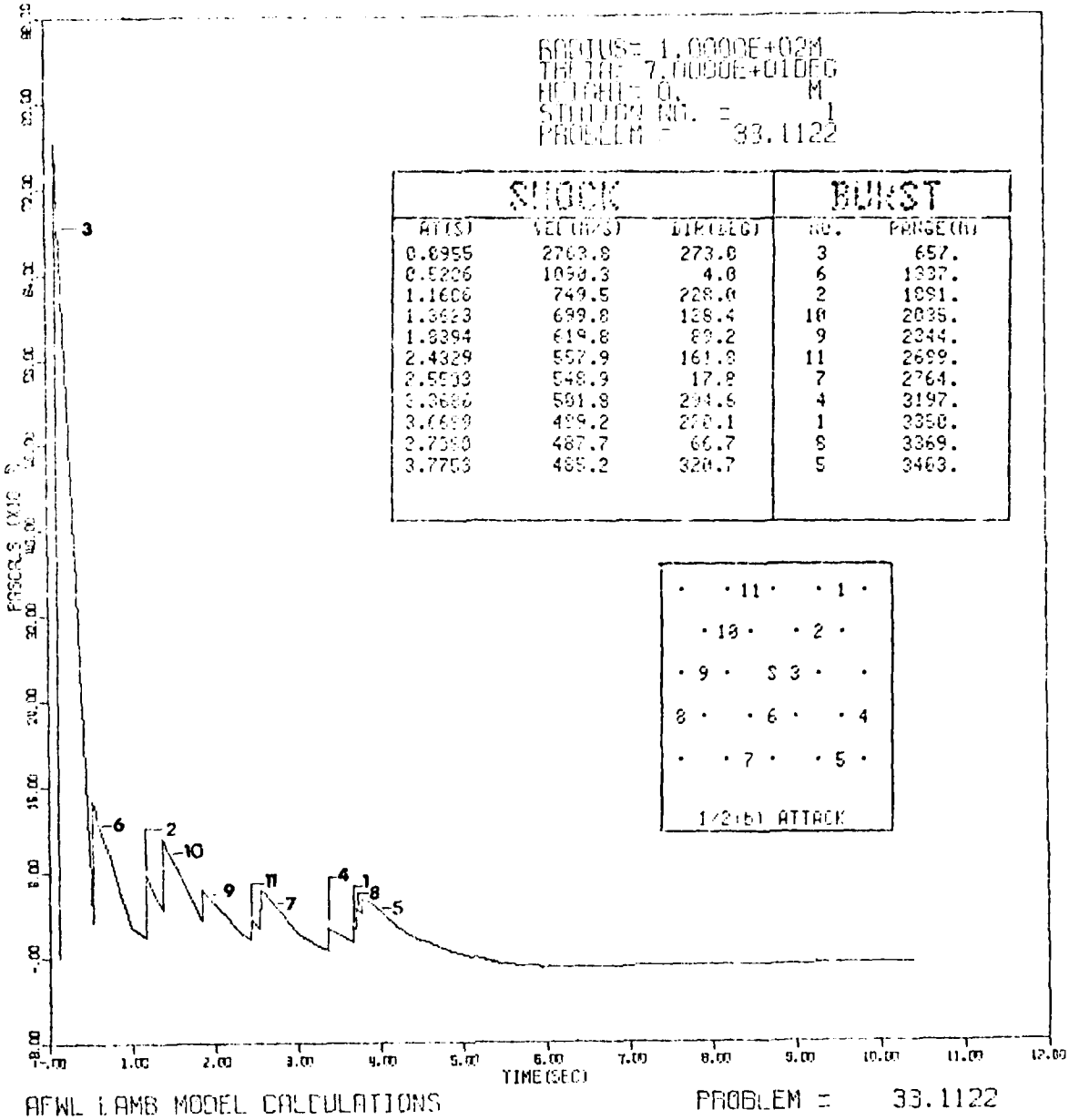


AFWL LAMS MODEL CALCULATIONS PROBLEM = 33.1012

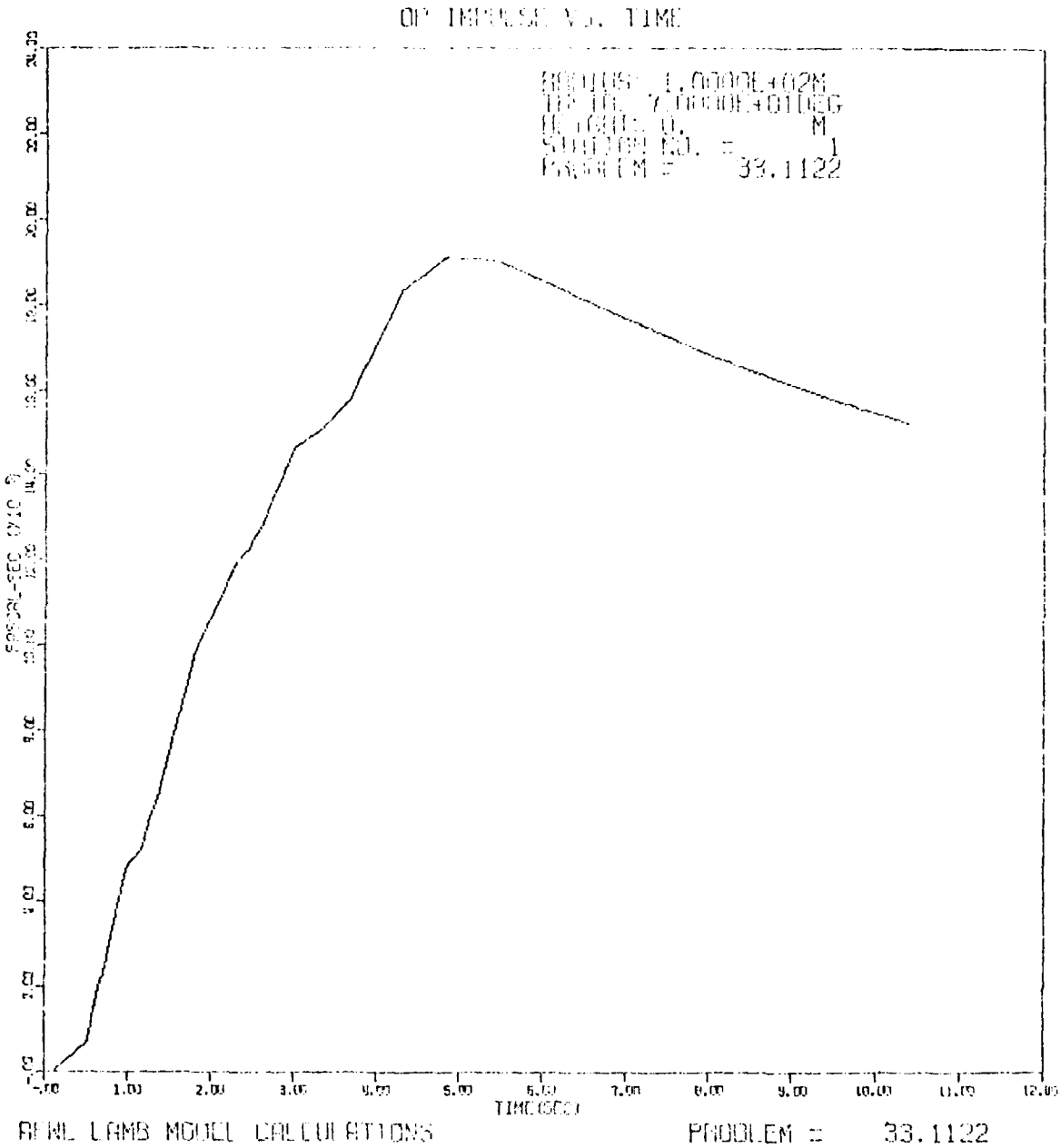

OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETHE 7.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.1012
PSCAL-SEC (X10 0
TIME(SEC)
AEWL LAMB MODEL CALCULATIONS
PROBLEM = 33.1012

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

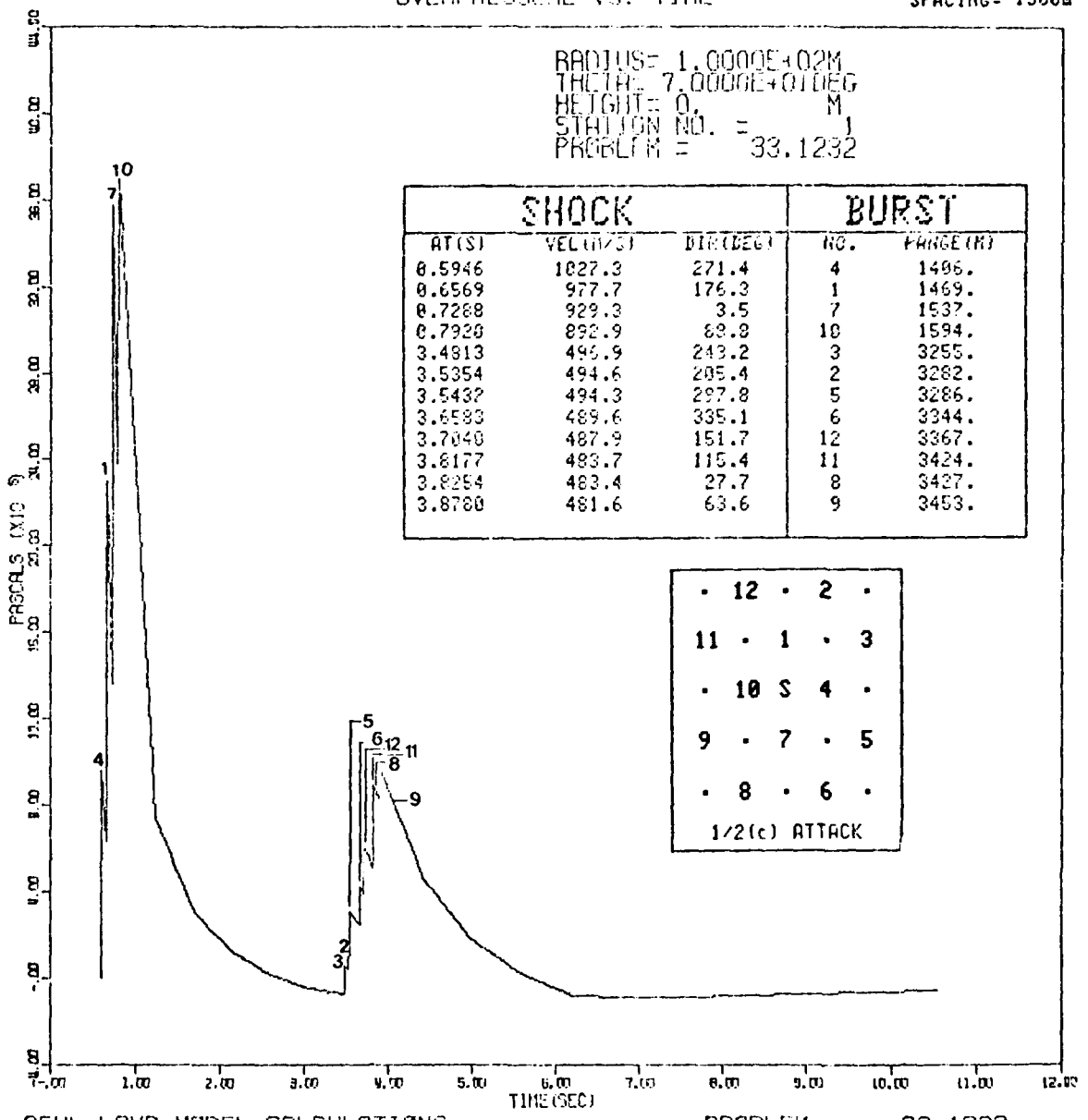


AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1122


OF IMPULSE Vs. TIME
RADIUS = 1.0000E+02M
TIP TIL = 7.0000E+01DEG
ELEVATION = 0. M
SOLUTION NO. = 1
PROBLEM = 33.1122
TIME(SEC)
REAL LAMB MODEL CALCULATIONS
PROBLEM = 33.1122

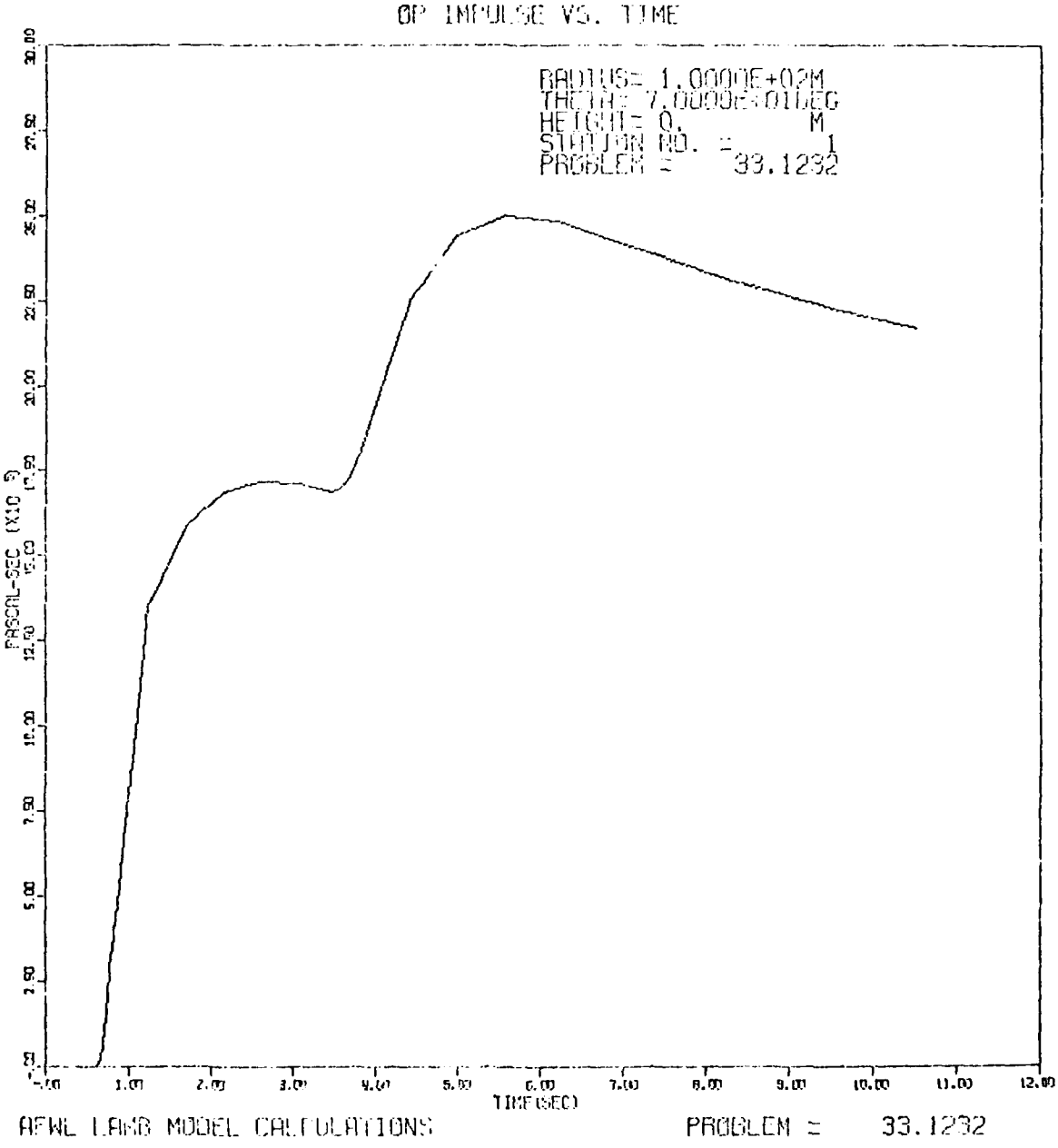
HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.5946	1027.3	271.4	4	1406.
0.6569	977.7	176.3	1	1469.
0.7288	929.3	3.5	7	1537.
0.7920	892.9	68.8	10	1594.
3.4813	496.9	243.2	3	3255.
3.5354	494.6	205.4	2	3282.
3.5432	494.3	297.8	5	3286.
3.6583	489.6	335.1	6	3344.
3.7040	487.9	151.7	12	3367.
3.8177	483.7	115.4	11	3424.
3.8254	483.4	27.7	8	3427.
3.8780	481.6	63.6	9	3453.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1232

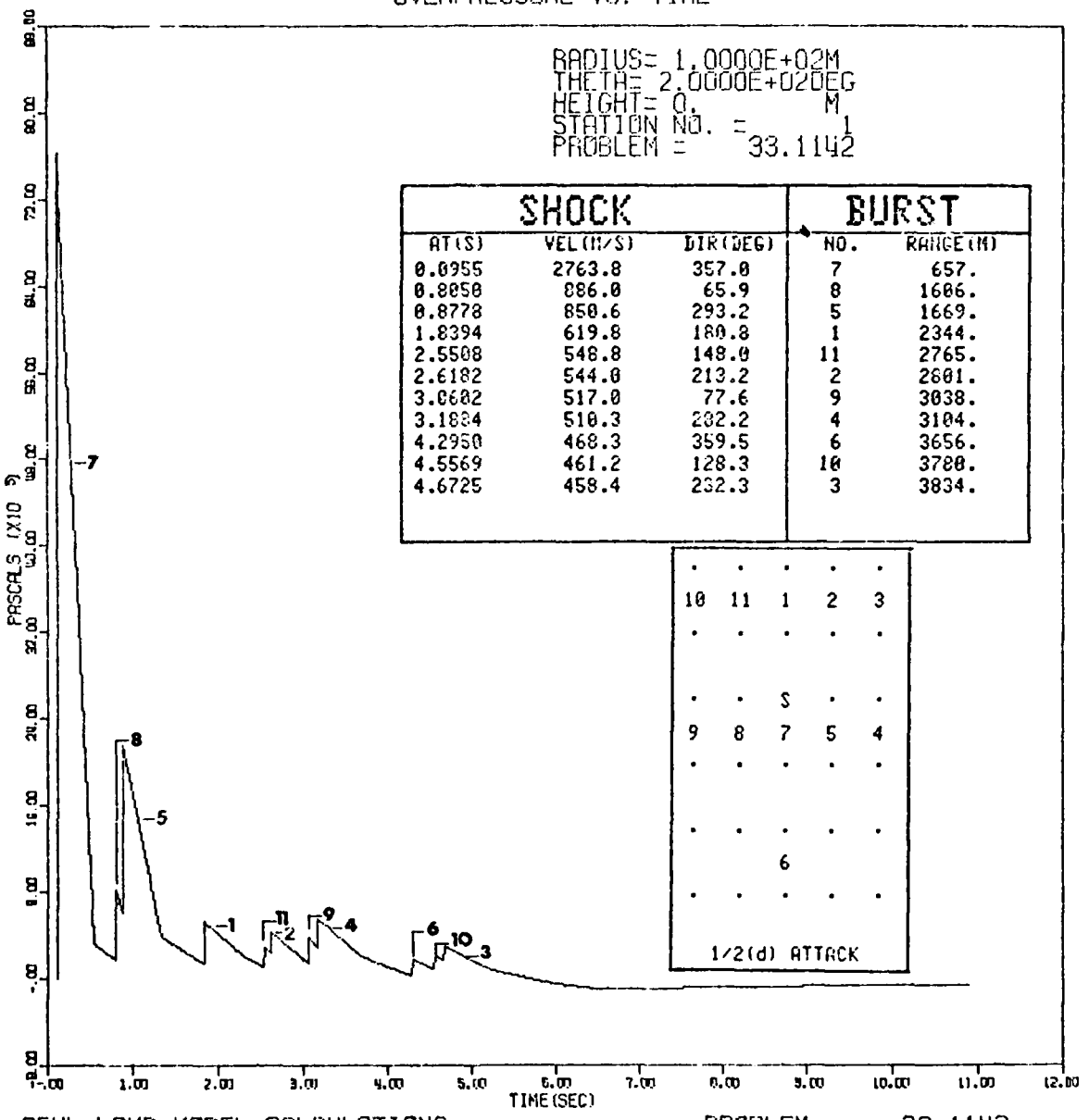

OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 7.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.1232
PASCAL-SEC (X10 5)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 33.1232

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

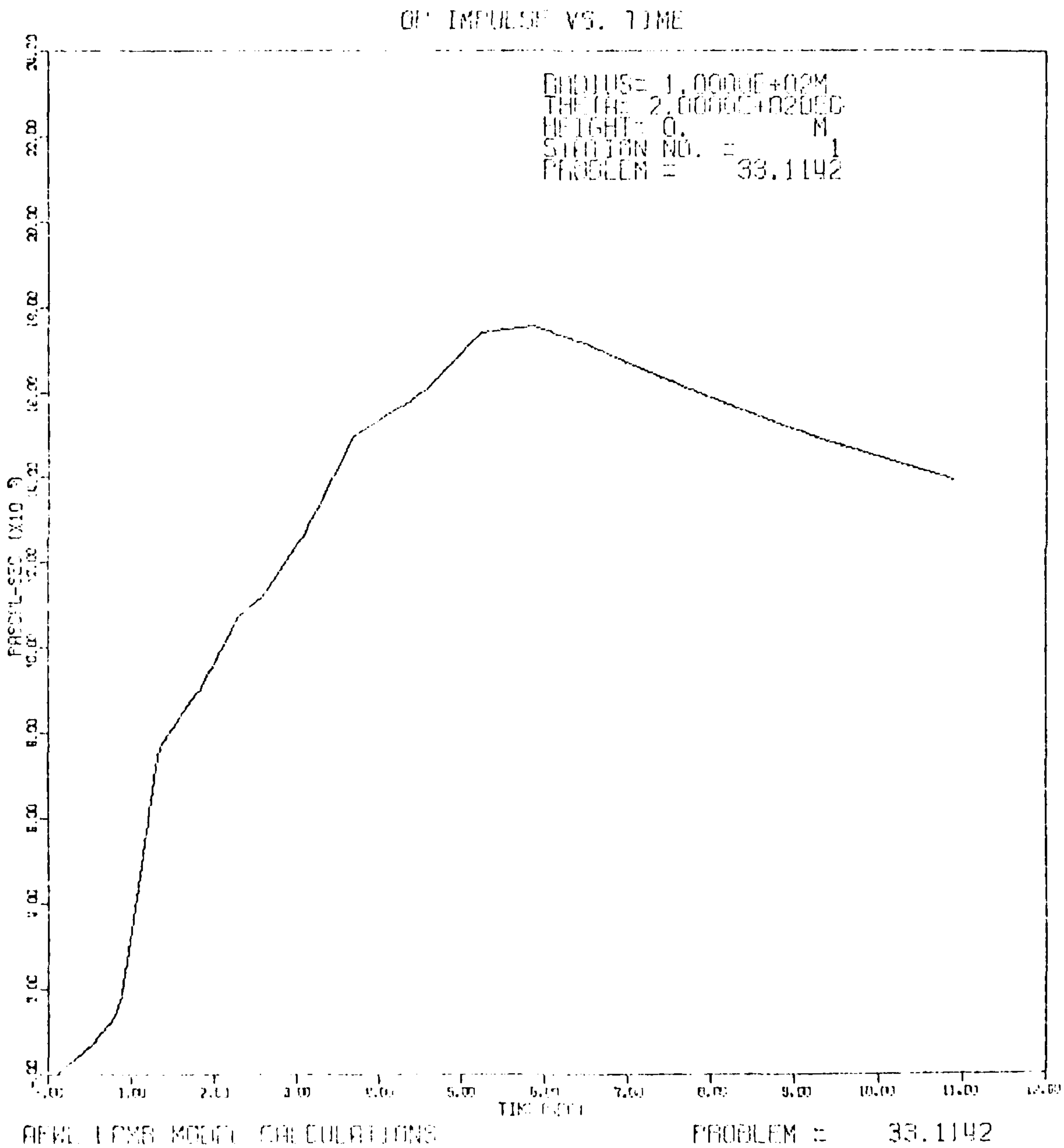
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 2.0000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.1142

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0955	2763.8	357.0	7	657.
0.8050	886.0	65.9	8	1606.
0.8778	850.6	293.2	5	1669.
1.8394	619.8	180.8	1	2344.
2.5508	548.8	148.0	11	2765.
2.6182	544.0	213.2	2	2801.
3.0602	517.0	77.6	9	3038.
3.1884	510.3	282.2	4	3104.
4.2950	468.3	359.5	6	3656.
4.5569	461.2	128.3	10	3780.
4.6725	458.4	232.3	3	3834.



AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1142

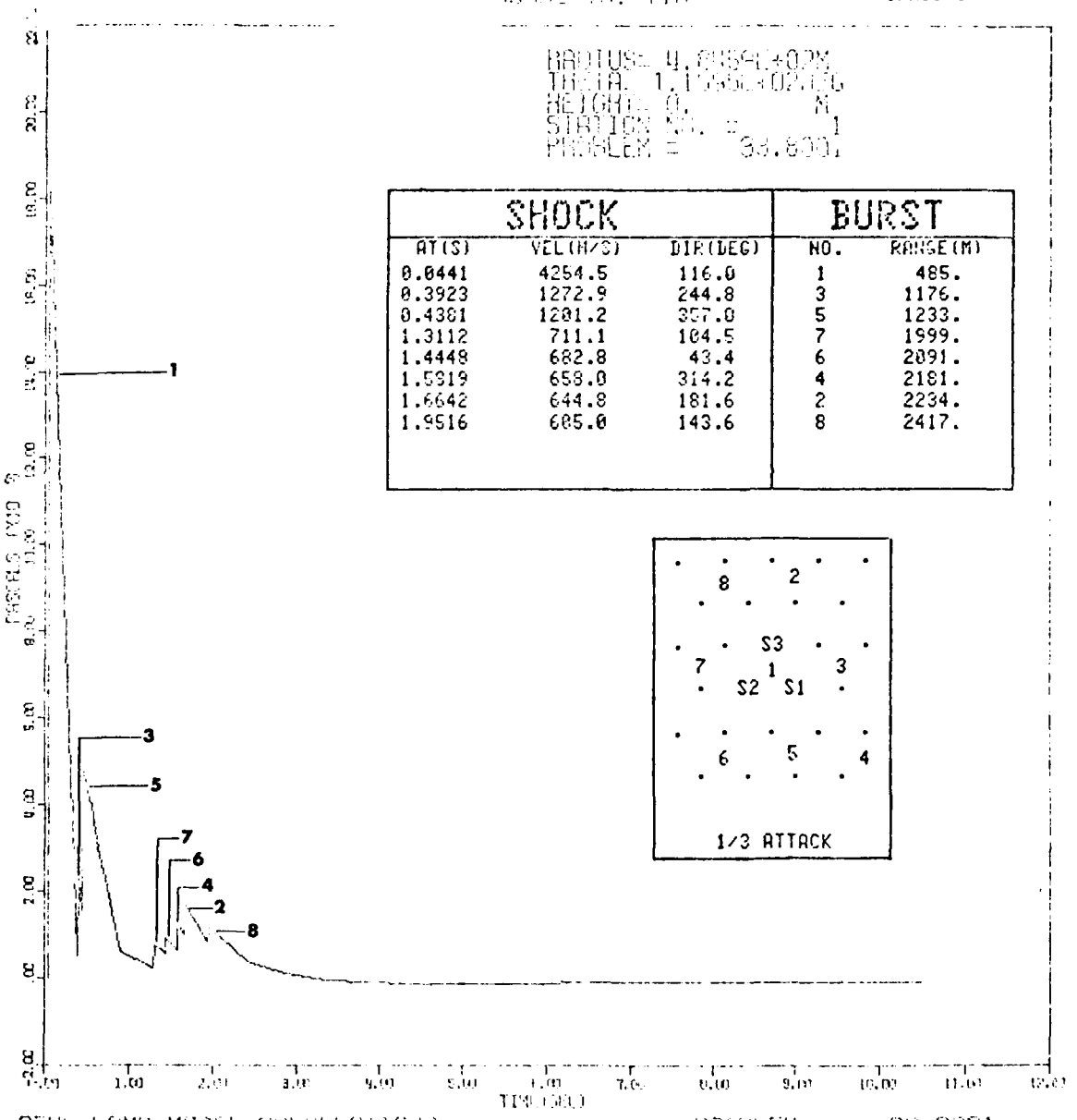

HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.1142
1.00
2.00
3.00
5.00
7.00
8.00
9.00
10.00
11.00
PROBLEM = 33.1142

HOB= 0m
YIELD= 3Mt
SPACING= 1000m

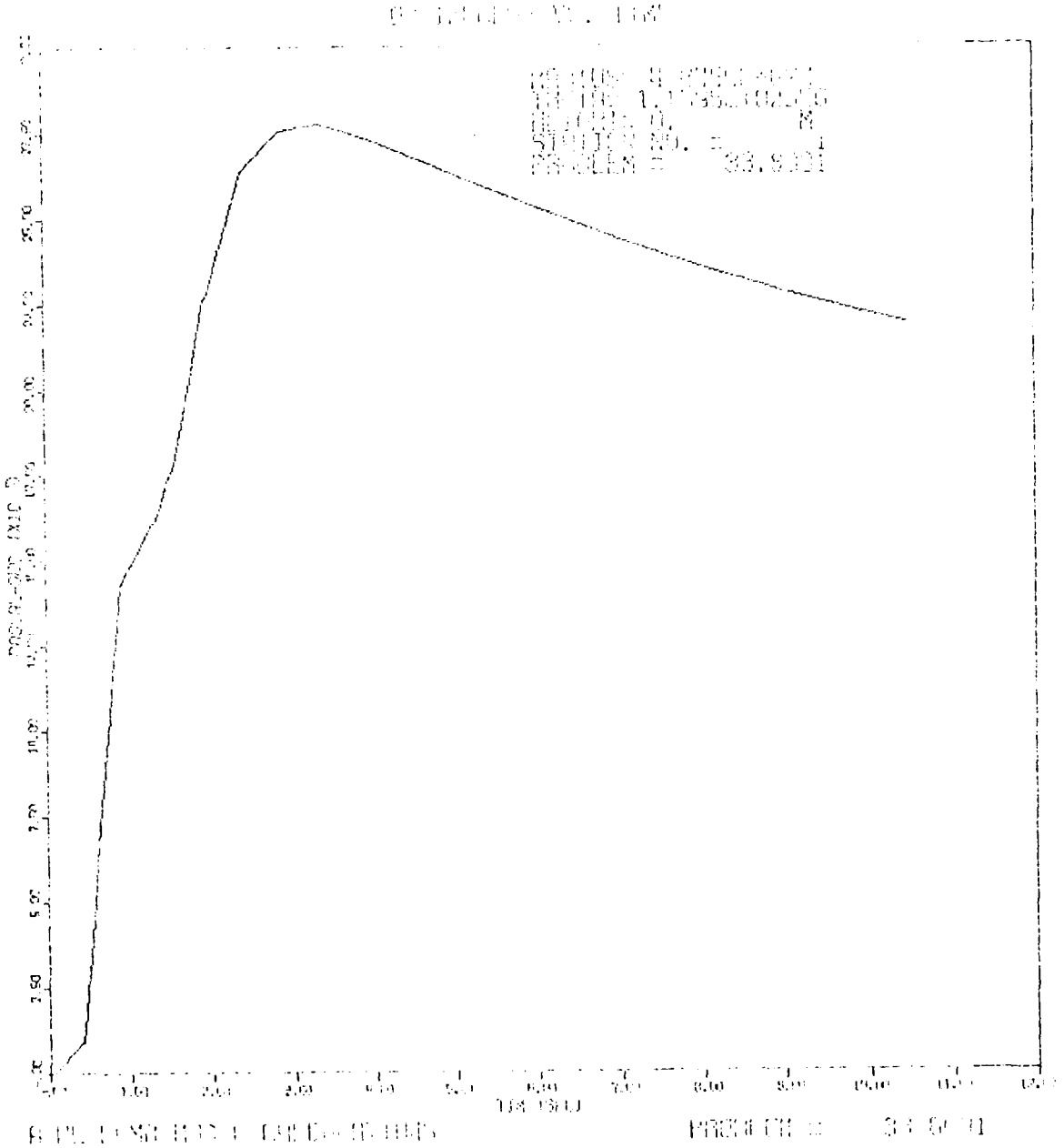
CASE NO. 111

RADIUS= 4.0854E+02M
THETA= 1.1956E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8301

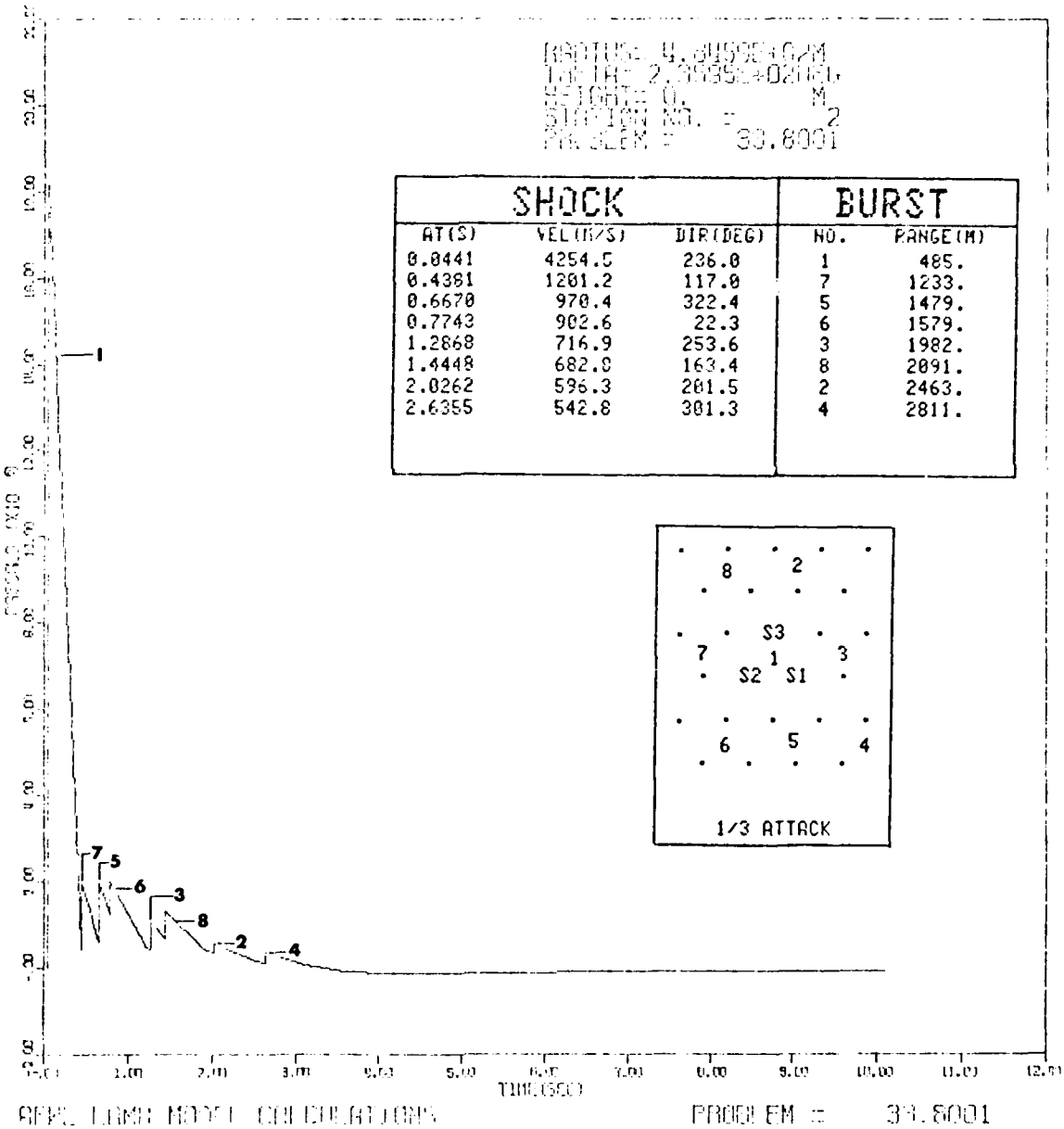
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0441	4254.5	116.0	1	485.
0.3923	1272.9	244.8	3	1176.
0.4381	1201.2	357.0	5	1233.
1.3112	711.1	104.5	7	1999.
1.4448	682.8	43.4	6	2091.
1.5919	658.0	314.2	4	2181.
1.6642	644.8	181.6	2	2234.
1.9516	605.0	143.6	8	2417.



AFWL LONG MODEL CALCULATIONS PROBLEM = 33.8301

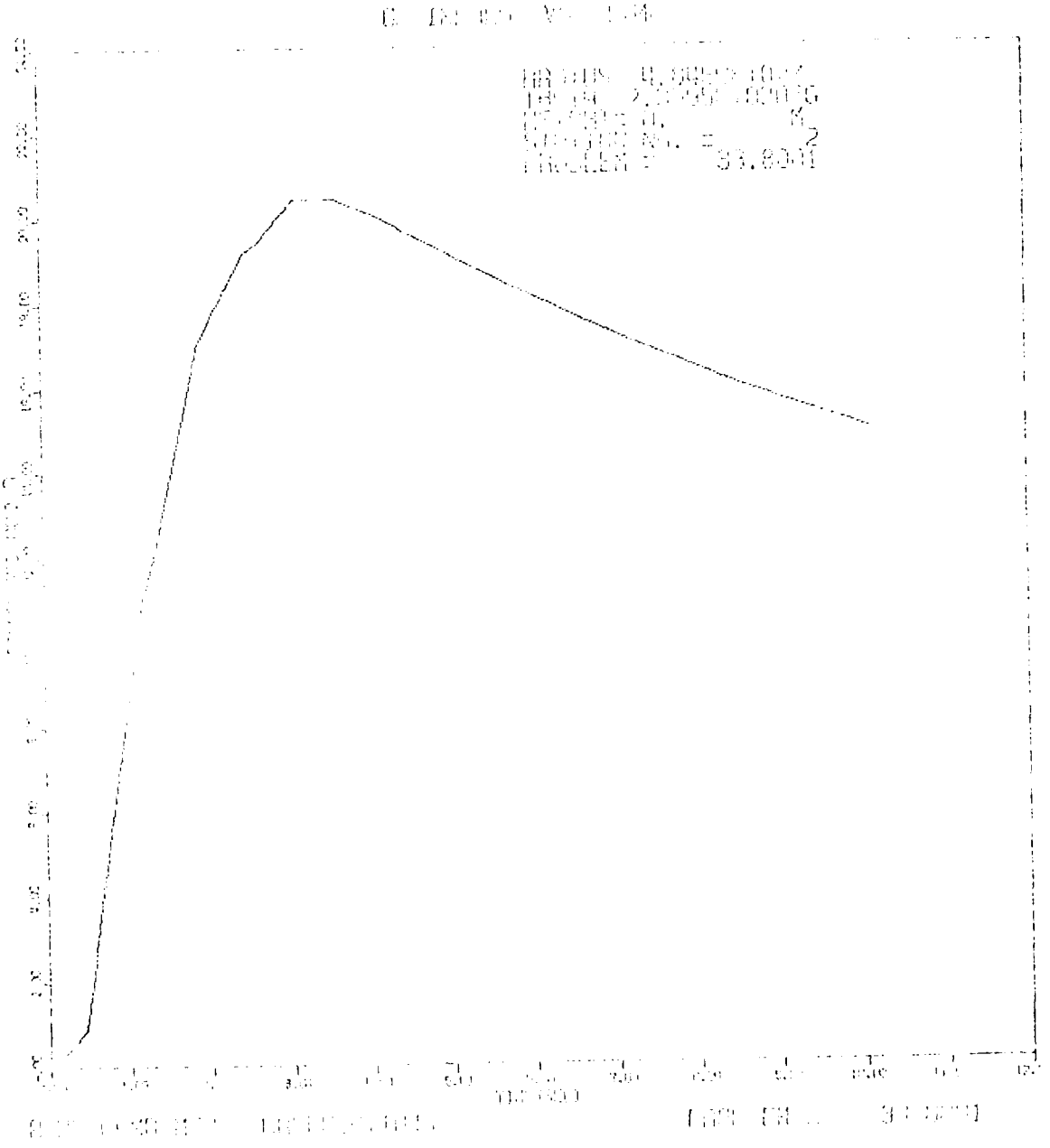


HOB= 0m
YIELD= 3Mt
SPACING= 1000m

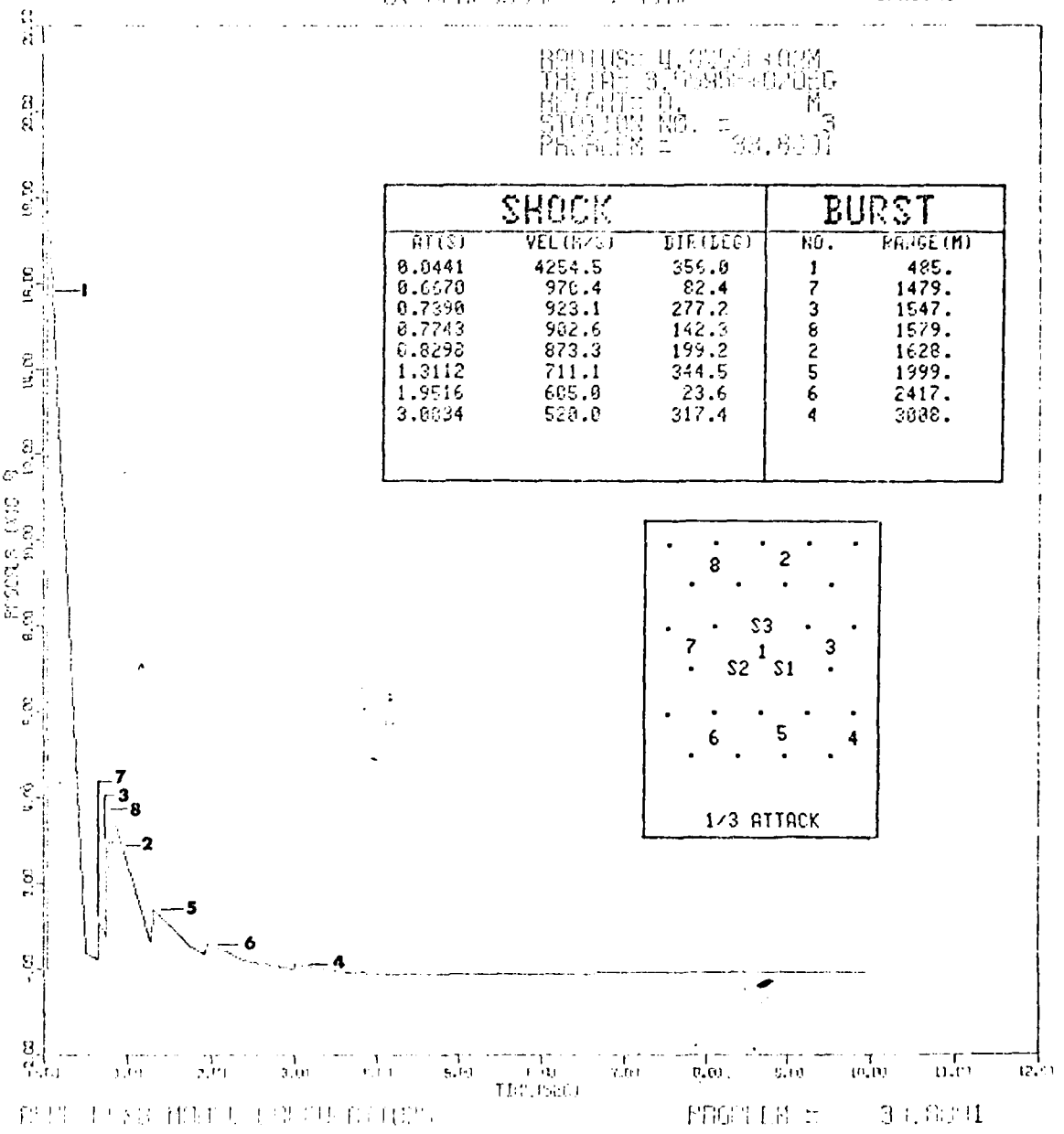


SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0441	4254.5	236.0	1	485.
0.4381	1201.2	117.0	7	1233.
0.6670	970.4	322.4	5	1479.
0.7743	902.6	22.3	6	1579.
1.2868	716.9	253.6	3	1982.
1.4448	682.8	163.4	8	2091.
2.0262	596.3	201.5	2	2463.
2.6355	542.8	301.3	4	2811.

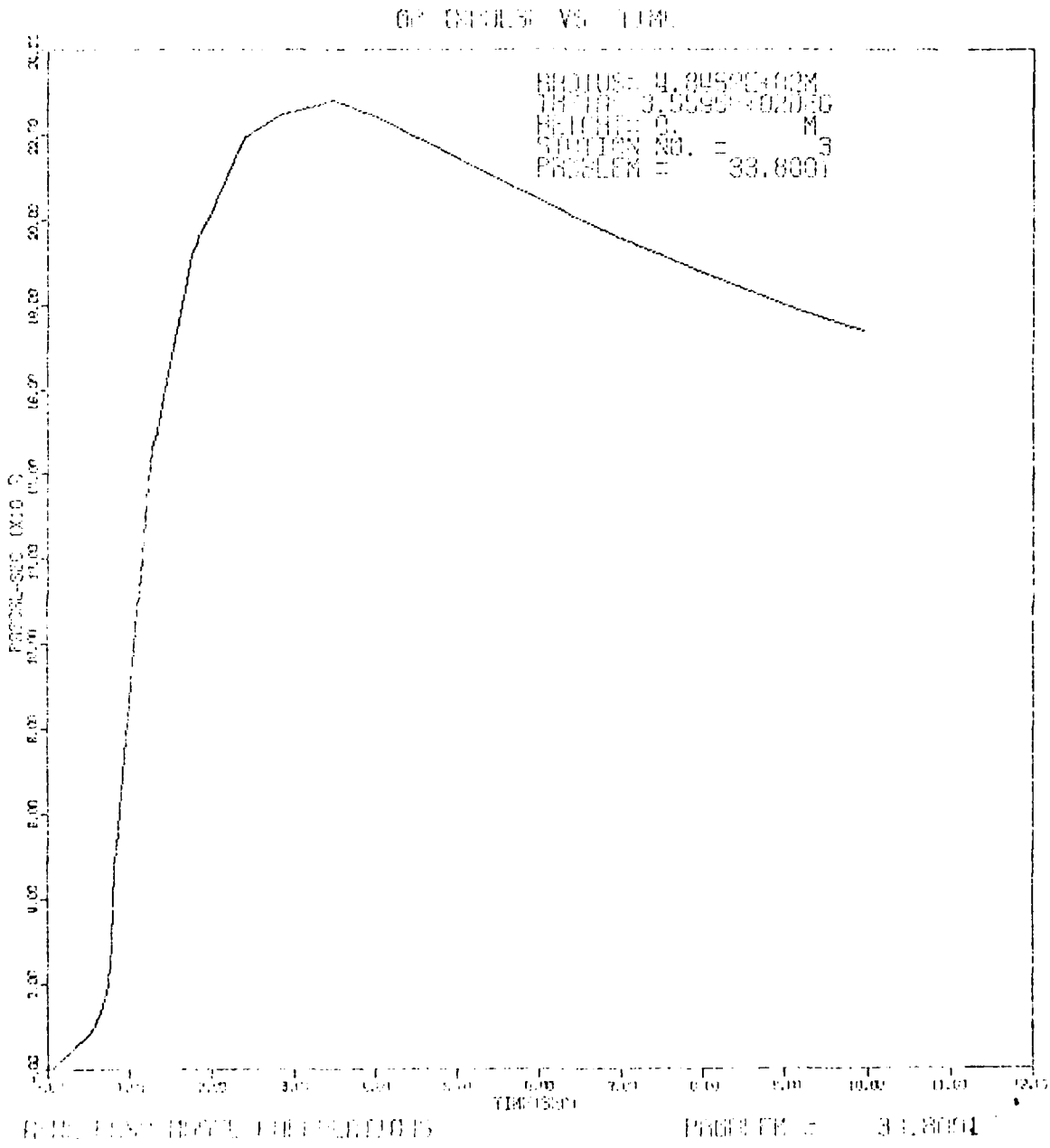
PROBLEM = 33.8001



HOB= 0m
YIELD= 3Mt
SPACING= 1000m



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.0441	4254.5	356.0	1	485.
0.6670	970.4	82.4	7	1479.
0.7390	923.1	277.2	3	1547.
0.7743	902.6	142.3	8	1579.
0.8298	873.3	199.2	2	1628.
1.3112	711.1	344.5	5	1999.
1.9516	605.0	23.6	6	2417.
3.0034	528.0	317.4	4	3088.

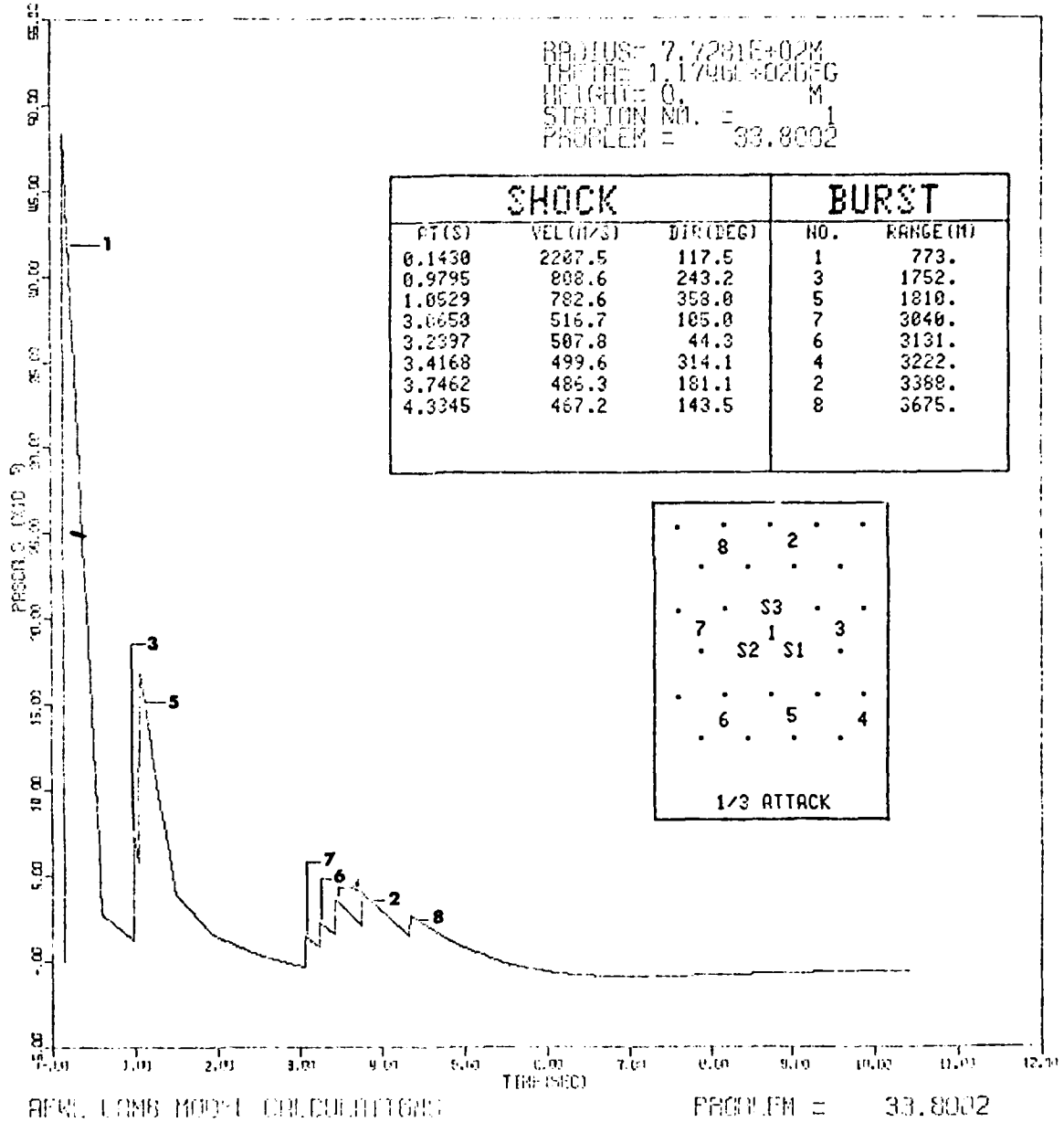

RADIUS= 4.8050E+03M
DEPTH= 3.0000E+02FG
HEIGHT= 0. M
SOLUTION NO. = 3
PASSLEN = 33.6001

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

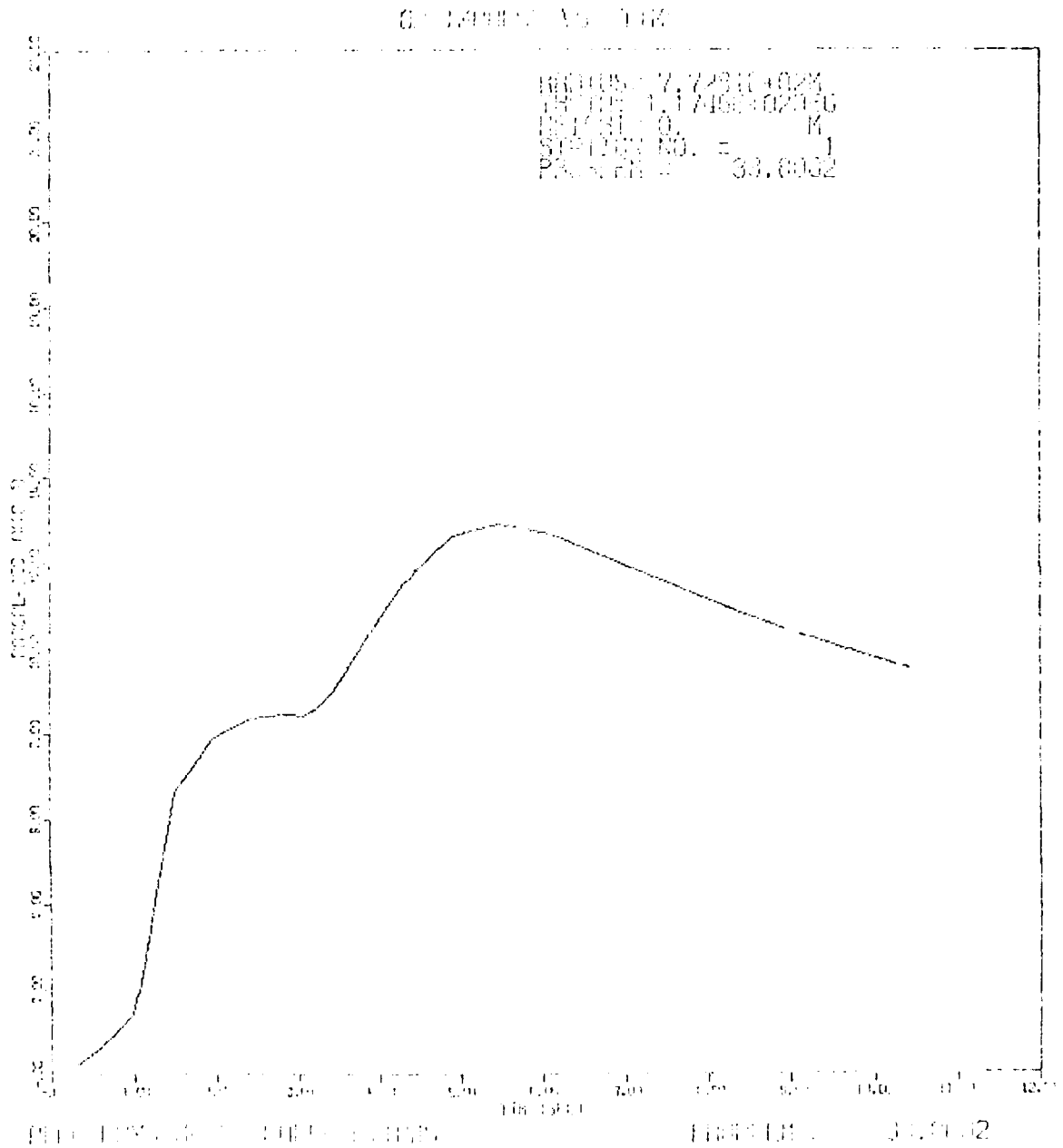
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
THETA= 1.1796E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8002

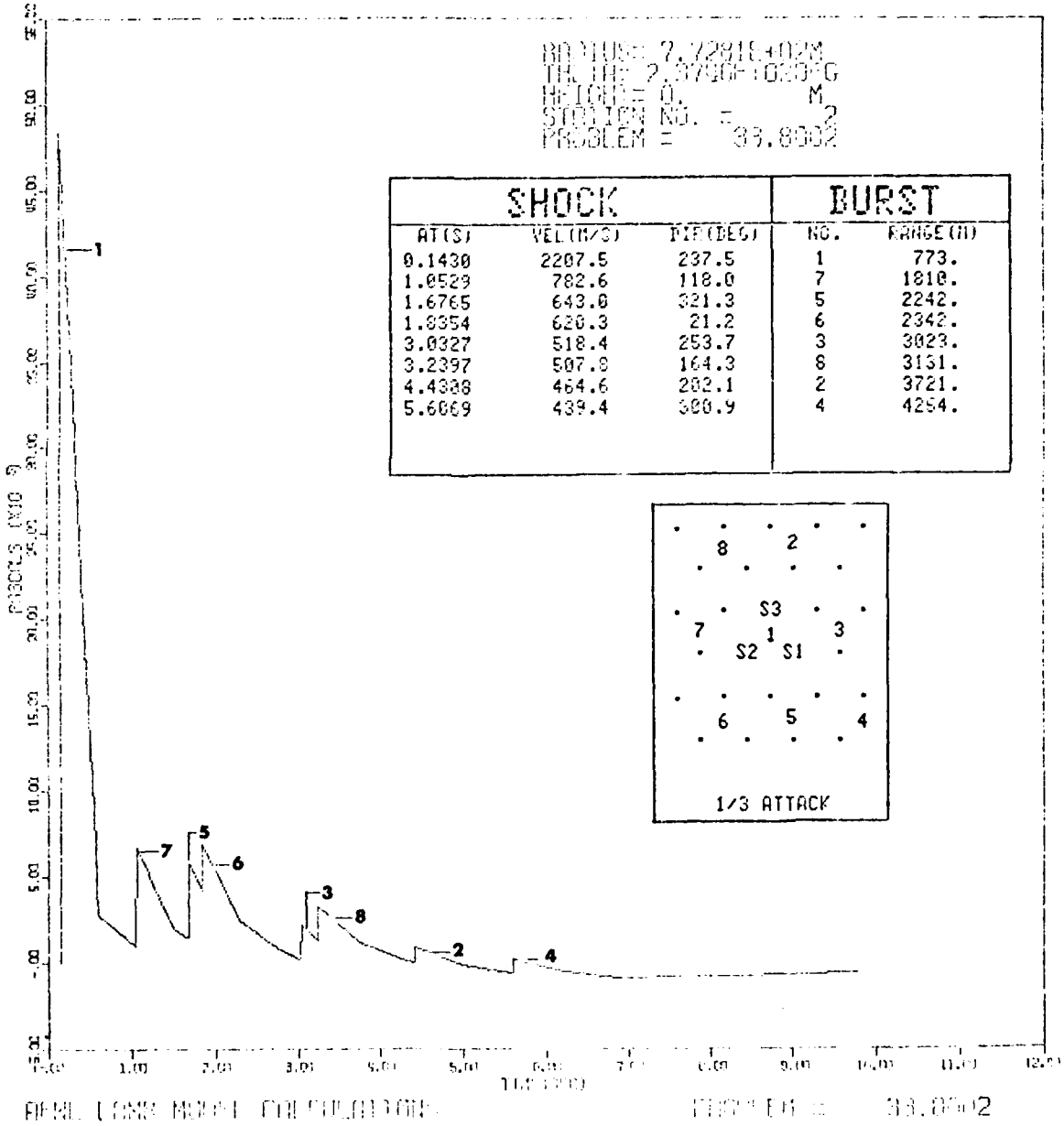
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	117.5	1	773.
0.9795	808.6	243.2	3	1752.
1.0529	782.6	358.0	5	1810.
3.0658	516.7	105.0	7	3040.
3.2397	507.8	44.3	6	3131.
3.4168	499.6	314.1	4	3222.
3.7462	486.3	181.1	2	3388.
4.3345	467.2	143.5	8	3675.



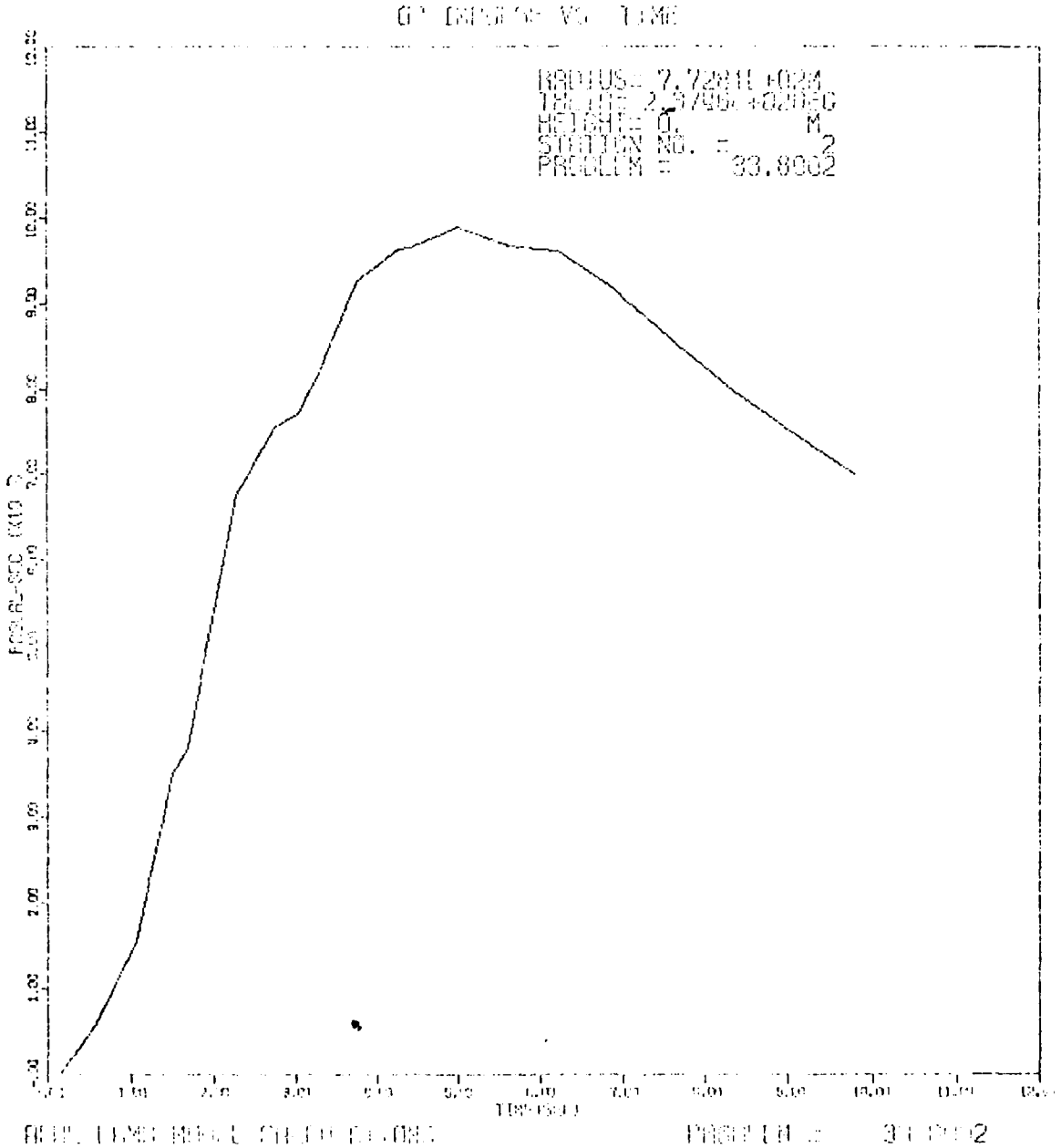
AFWL LOAD MODEL CALCULATIONS PROBLEM = 33.8002



HOB= 0m
YIELD= 3Mt
SPACING= 1500m



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	237.5	1	773.
1.0529	782.6	118.0	7	1818.
1.6765	643.8	321.3	5	2242.
1.8354	620.3	21.2	6	2342.
3.0327	518.4	253.7	3	3023.
3.2397	507.8	164.3	8	3151.
4.4308	464.6	202.1	2	3721.
5.6069	439.4	300.9	4	4294.

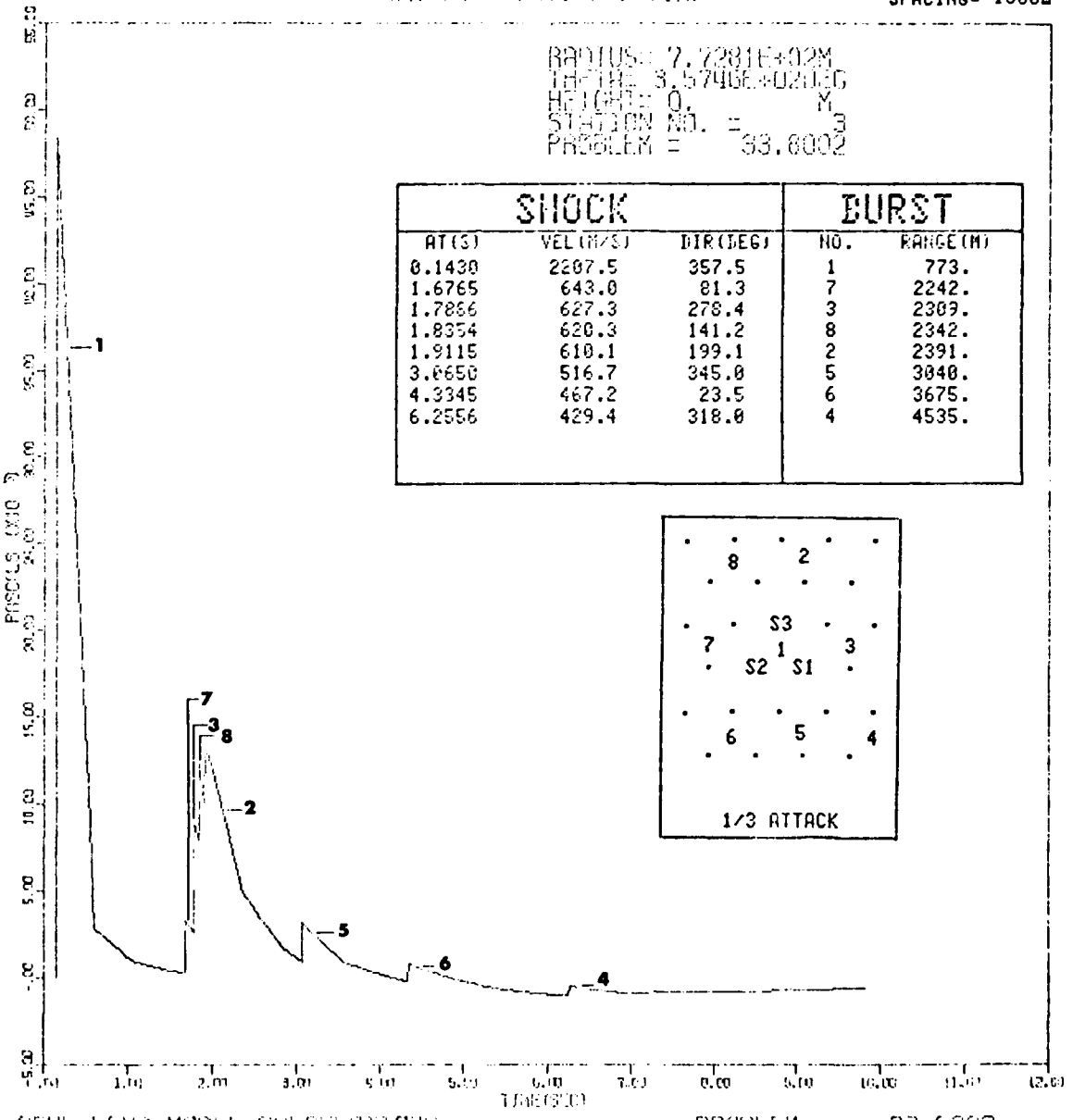

RADIUS= 7.7281E+024
PRESSURE =
33.8002

HOB= 0a
YIELD= 3Mt
SPACING= 1500a

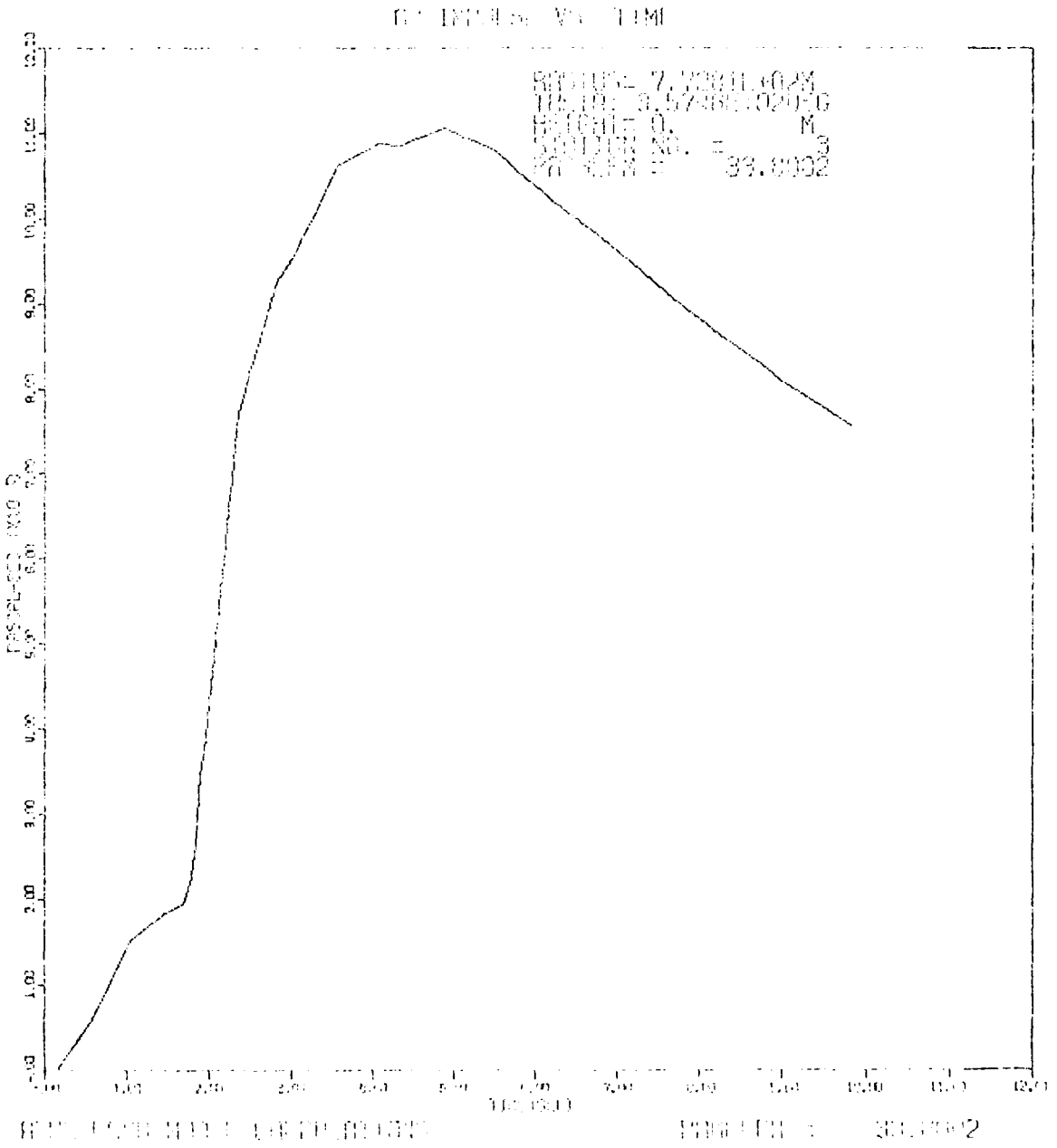
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
TAPIR= 3.5740E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 33.0002

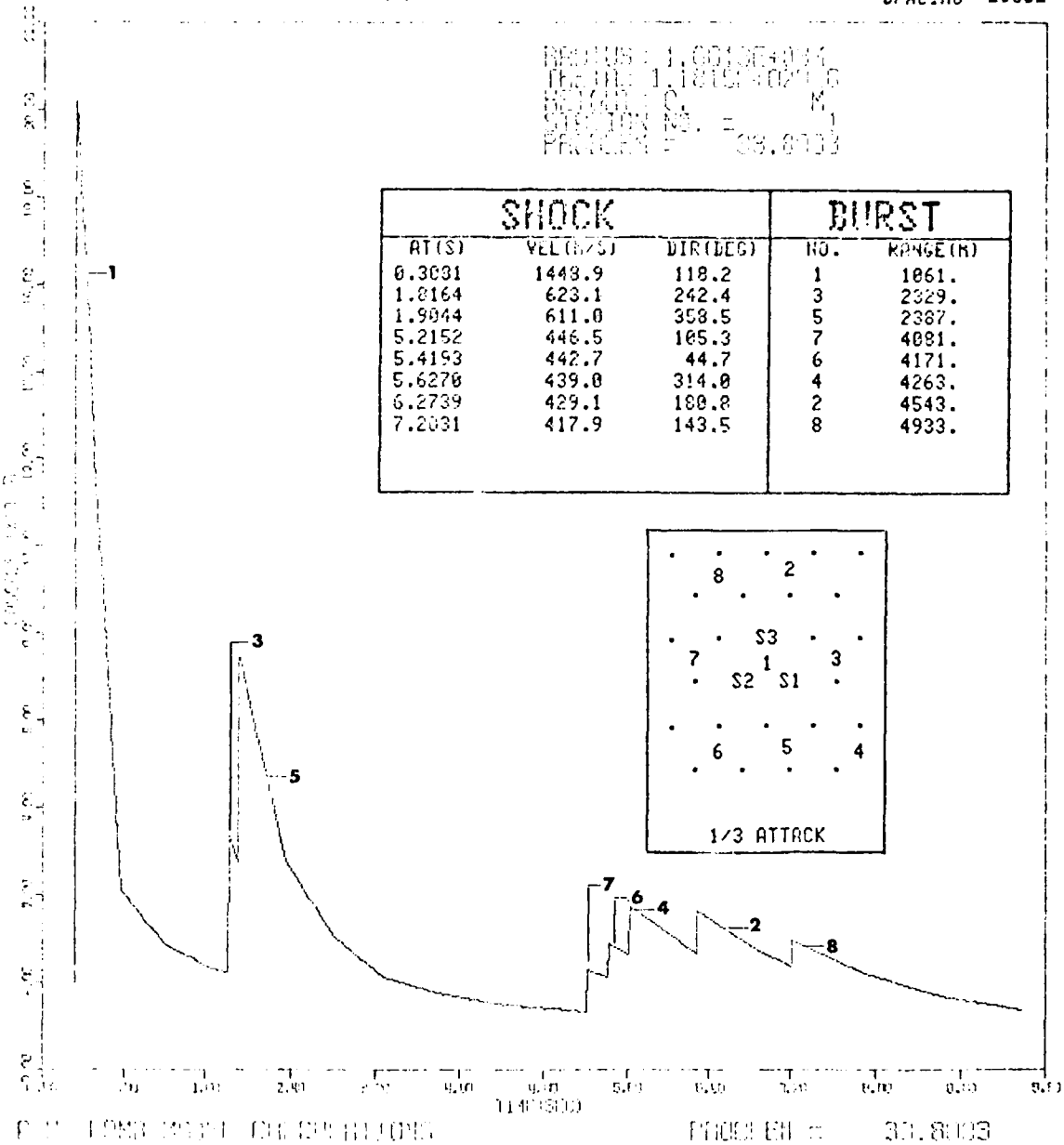
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	357.5	1	773.
1.6765	643.0	81.3	7	2242.
1.7866	627.3	278.4	3	2309.
1.8354	620.3	141.2	8	2342.
1.9115	610.1	199.1	2	2391.
3.0650	516.7	345.0	5	3040.
4.3345	467.2	23.5	6	3675.
6.2556	429.4	318.0	4	4535.



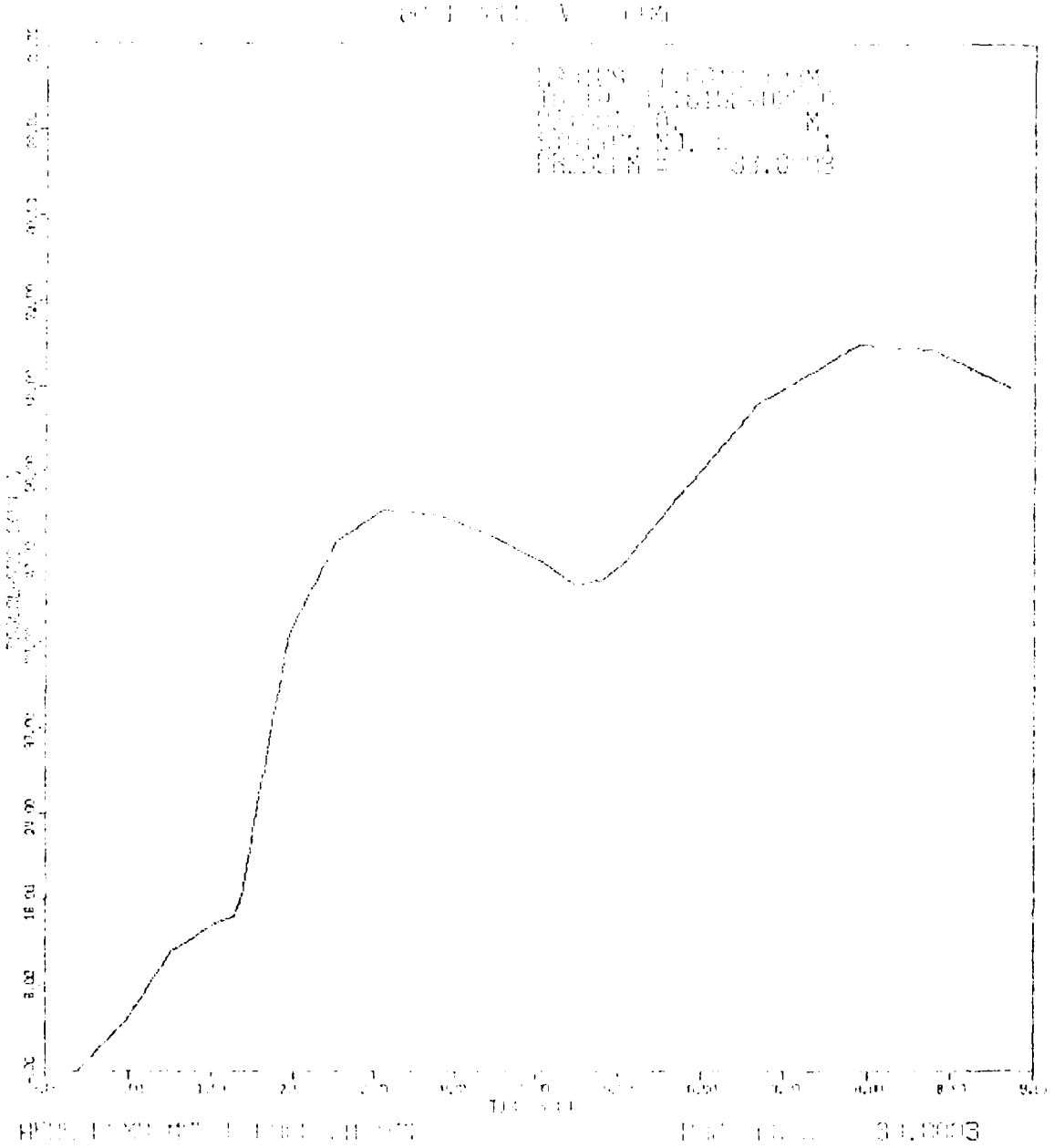
NEWL LONG MODEL CALCULATIONS PROBLEM = 33.0002



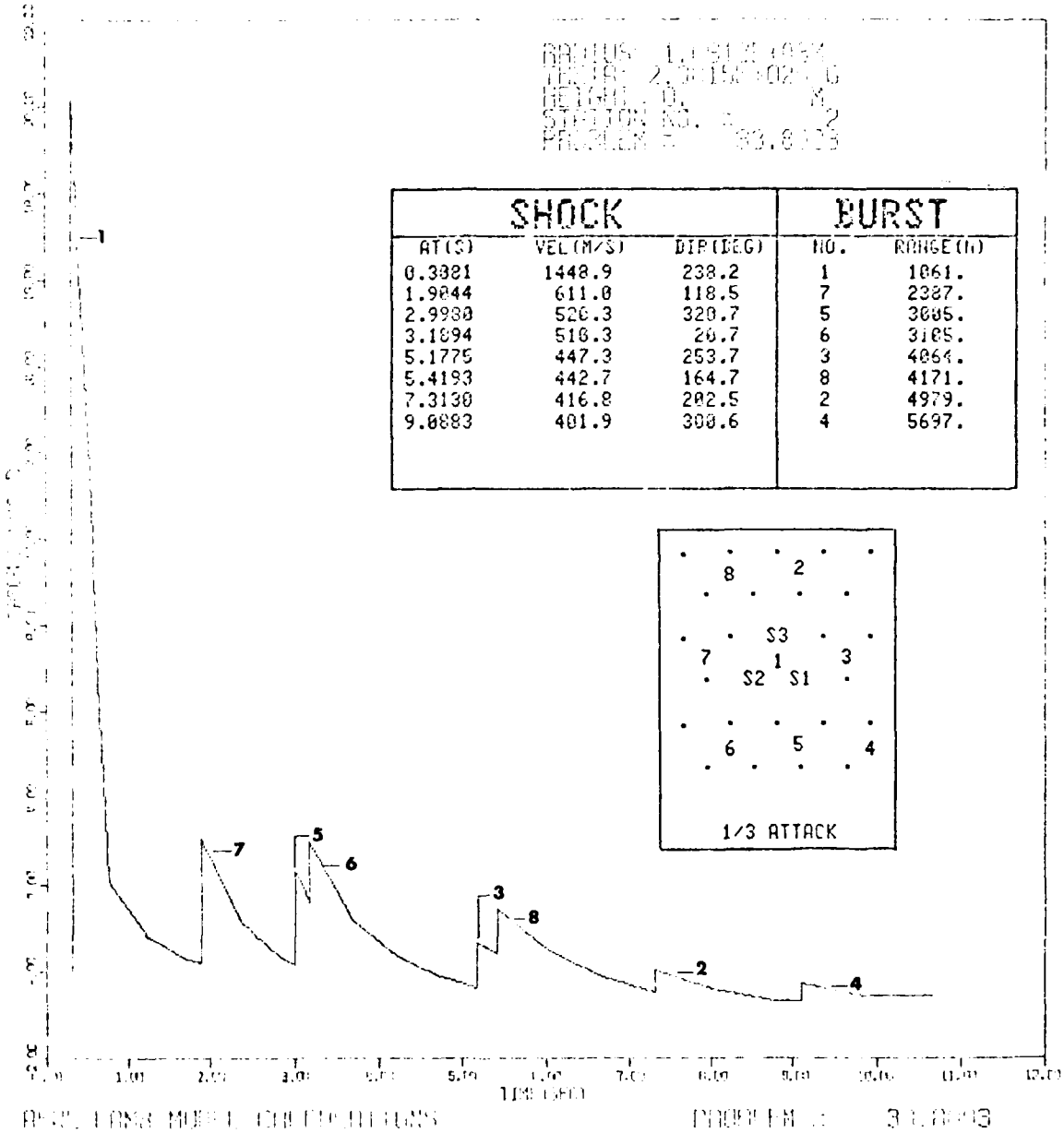
HOB= 0m
YIELD= 3Mt
SPACING= 2000m



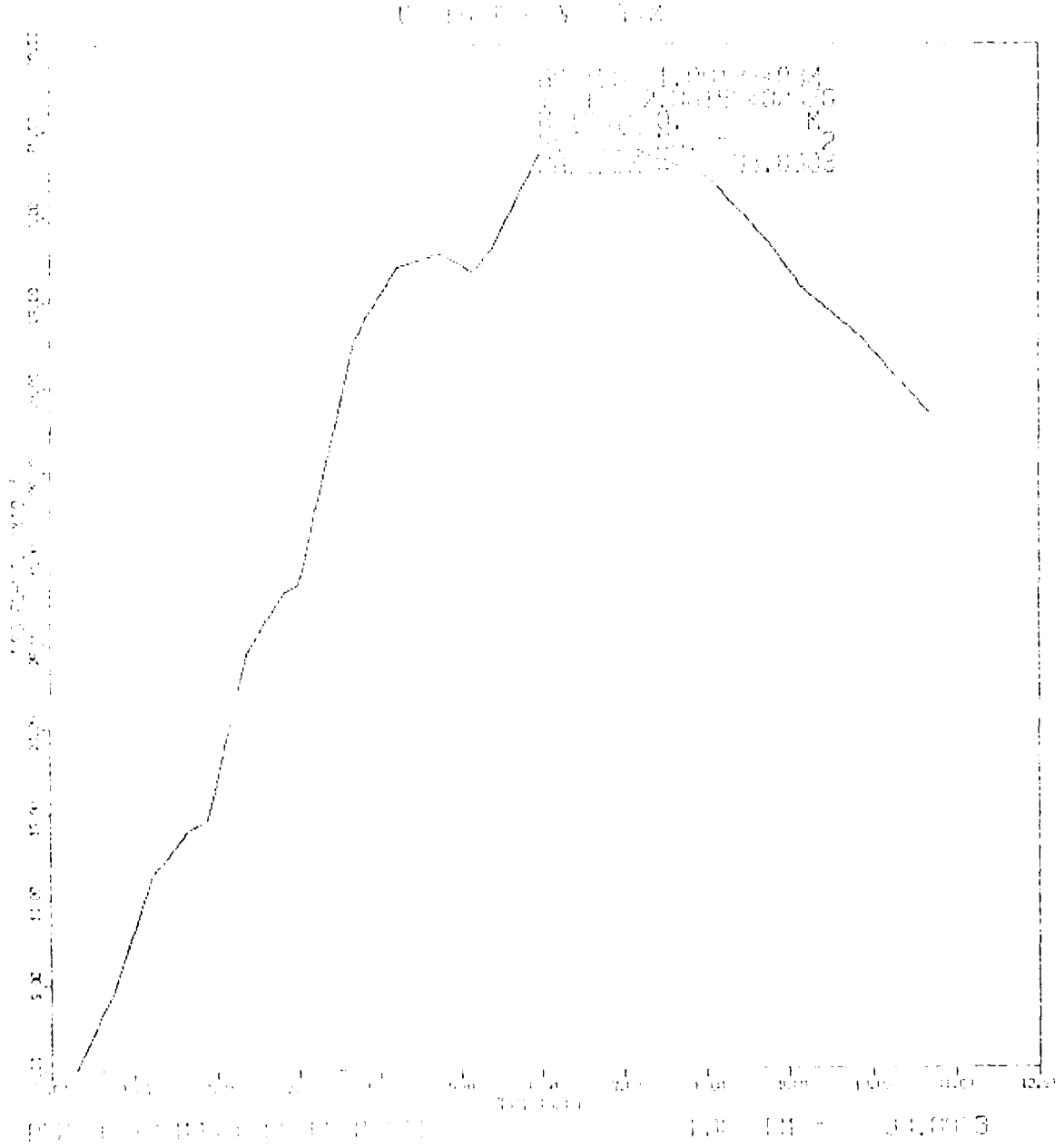
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3031	1448.9	118.2	1	1061.
1.8164	623.1	242.4	3	2329.
1.9044	611.0	358.5	5	2387.
5.2152	446.5	105.3	7	4081.
5.4193	442.7	44.7	6	4171.
5.6270	439.0	314.0	4	4263.
6.2739	429.1	180.8	2	4543.
7.2031	417.9	143.5	8	4933.



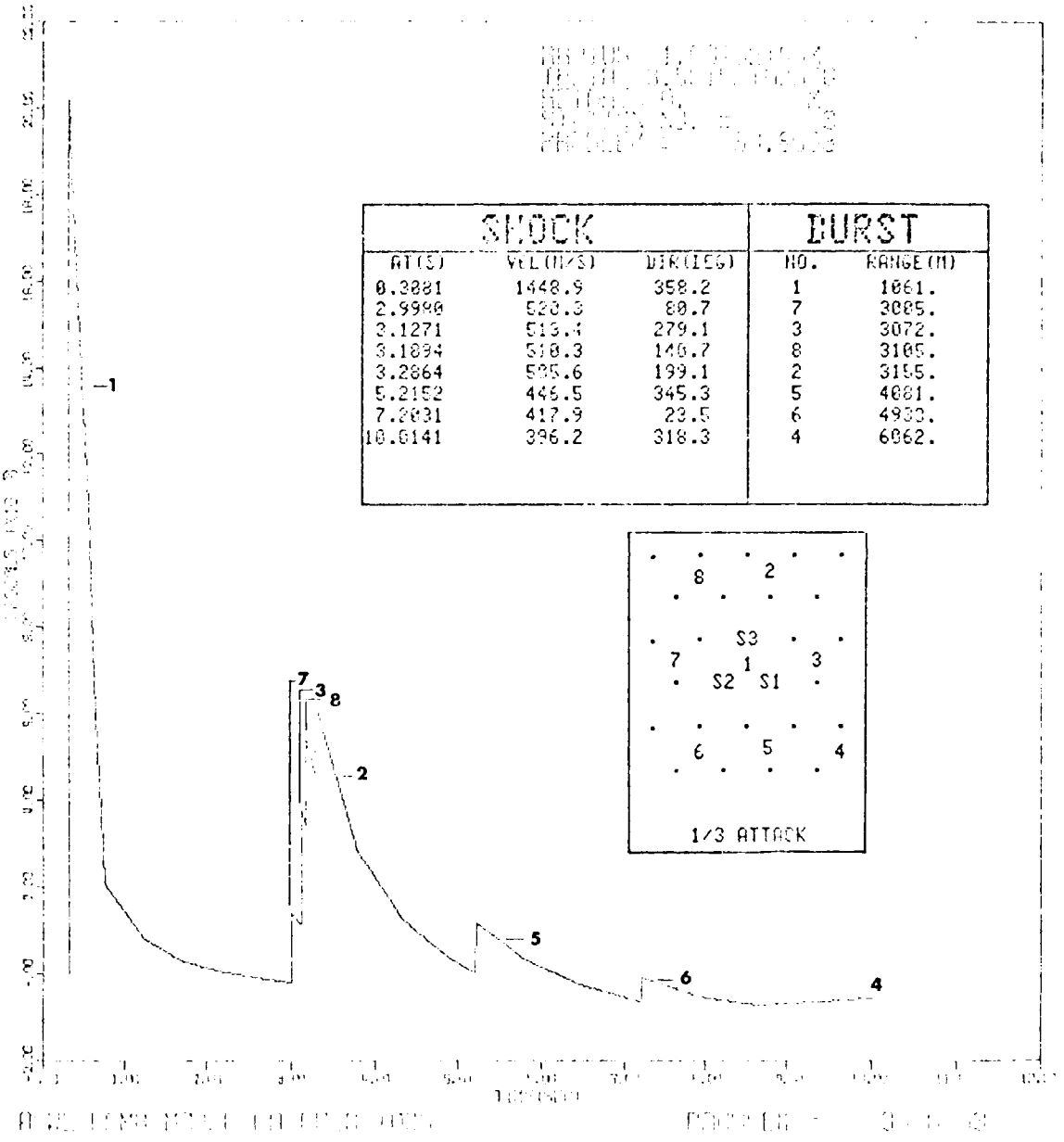
HOB= 0m
YIELD= 3Mt
SPACING= 2000m



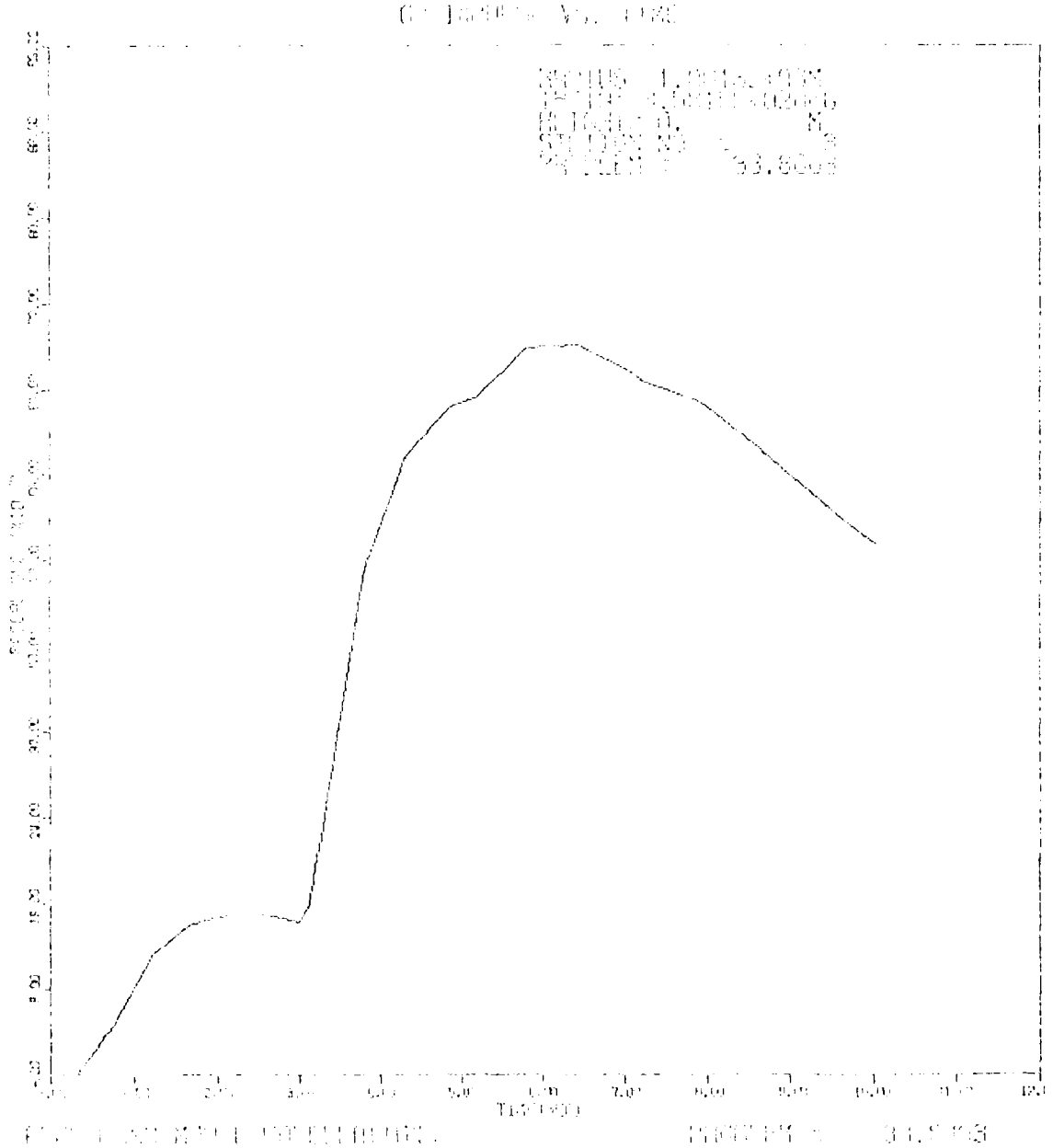
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3381	1448.9	238.2	1	1061.
1.9044	611.0	118.5	7	2387.
2.9930	520.3	320.7	5	3005.
3.1094	516.3	20.7	6	3105.
5.1775	447.3	253.7	3	4064.
5.4193	442.7	164.7	8	4171.
7.3130	416.8	202.5	2	4979.
9.0883	401.9	300.6	4	5697.



HOB= 0m
YIELD= 3Mt
SPACING= 2000m



SHOCK			BURST	
ATT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3081	1448.9	358.2	1	1061.
2.9990	523.3	80.7	7	3085.
3.1271	513.4	279.1	3	3072.
3.1894	510.3	140.7	8	3105.
3.2864	505.6	199.1	2	3155.
5.2152	446.5	345.3	5	4881.
7.2031	417.9	23.5	6	4933.
10.0141	396.2	318.3	4	6062.

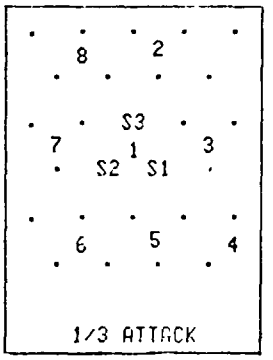


HOB= 0m
YIELD= 5Mt
SPACING= 1000m

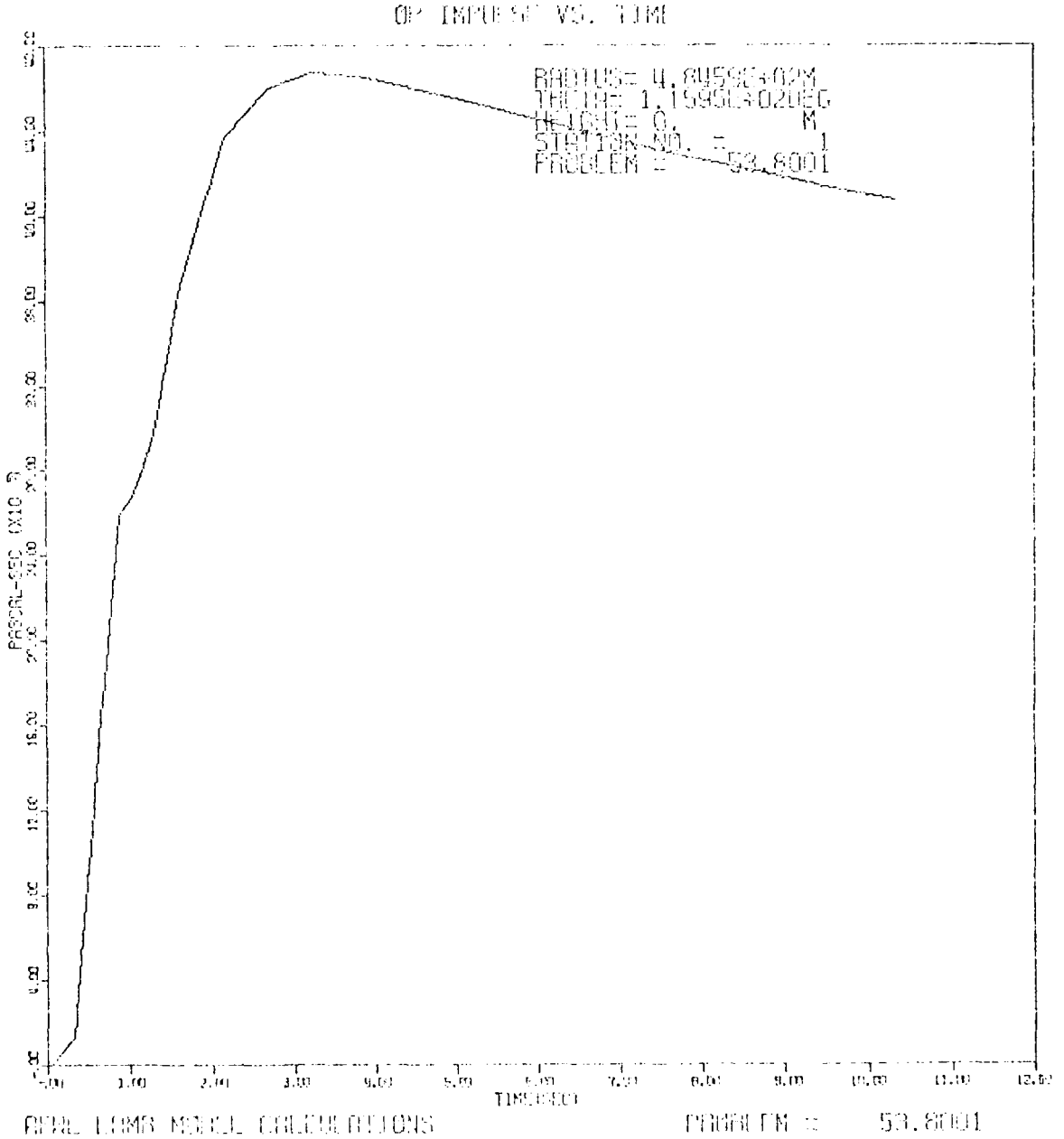
OVERPRESSURE VS. TIME

RADIUS= 4.8955E+02M
THETA= 1.1905E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.8001

SHOCK			BURST	
AT(S)	VEL(M/S)	DIP(DEG)	NO.	RANGE(M)
0.0336	5438.7	116.0	1	485.
0.3110	1592.8	244.8	3	1176.
0.3491	1487.1	357.0	5	1233.
1.0559	841.2	104.5	7	1999.
1.1782	803.3	43.4	6	2091.
1.2944	770.8	314.2	4	2181.
1.3945	752.3	181.6	2	2234.
1.6213	698.6	143.6	8	2417.



AFRL LAMS MODEL CALCULATIONS PROBLEM = 53.8001

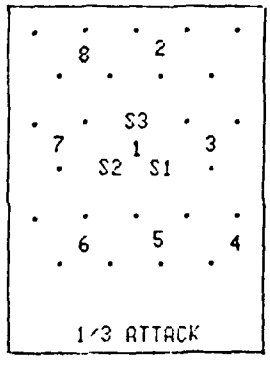

OF IMPULSE VS. TIME
RADIUS= 4.8959E+02M
THETA= 1.1595E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.8001
PASCAL-SEC (X10 **
TIME(SEC)

HOB= 0m
YIELD= 5Mt
SPACING= 1000m

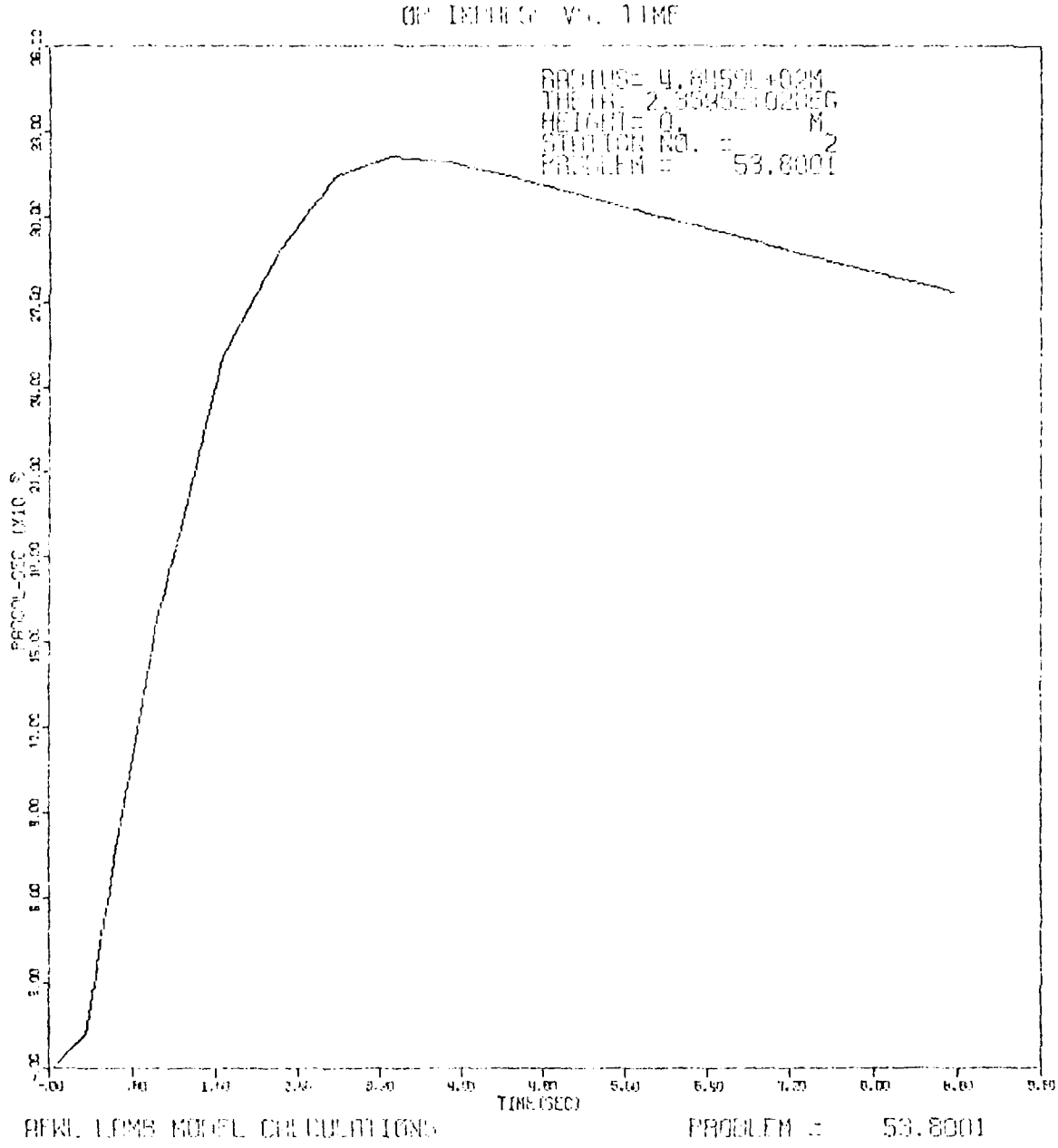
OVERPRESSURE VS. TIME

RADIUS= 4.000000KM
THETA= 2.356500E+002DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 53.8001

SHOCK			BURST	
TIME(S)	VELOCITY(FT/SEC)	DIR(DEG)	NO.	RANGE(M)
0.0336	5438.7	236.0	1	485.
0.3421	1457.1	117.0	7	1233.
0.5295	1154.6	322.4	5	1479.
0.6211	1045.3	22.3	6	1579.
1.0493	849.6	253.6	3	1962.
1.1782	803.3	163.4	8	2091.
1.6652	696.9	201.5	2	2460.
2.2334	614.2	301.3	4	2811.



PEARL LAMAR MODEL CALCULATIONS PROBLEM = 53.8001



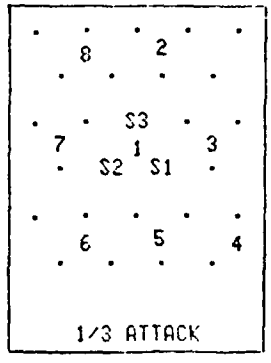
AFWL LOMB MODEL CALCULATIONS PROBLEM = 53.8001

HOB= 0m
YIELD= 5Mt
SPACING= 1000m

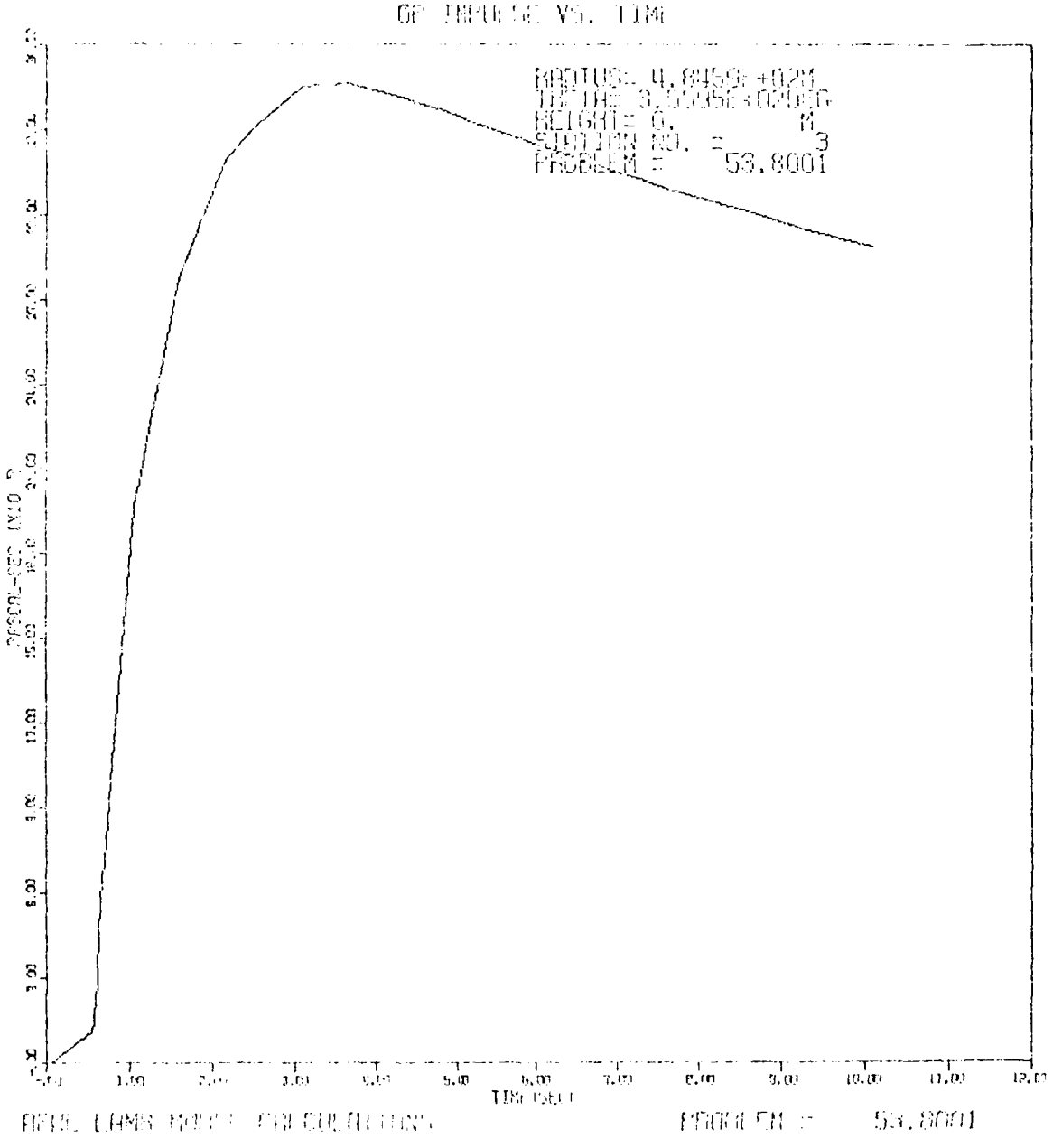
OVERPRESSURE VS. TIME

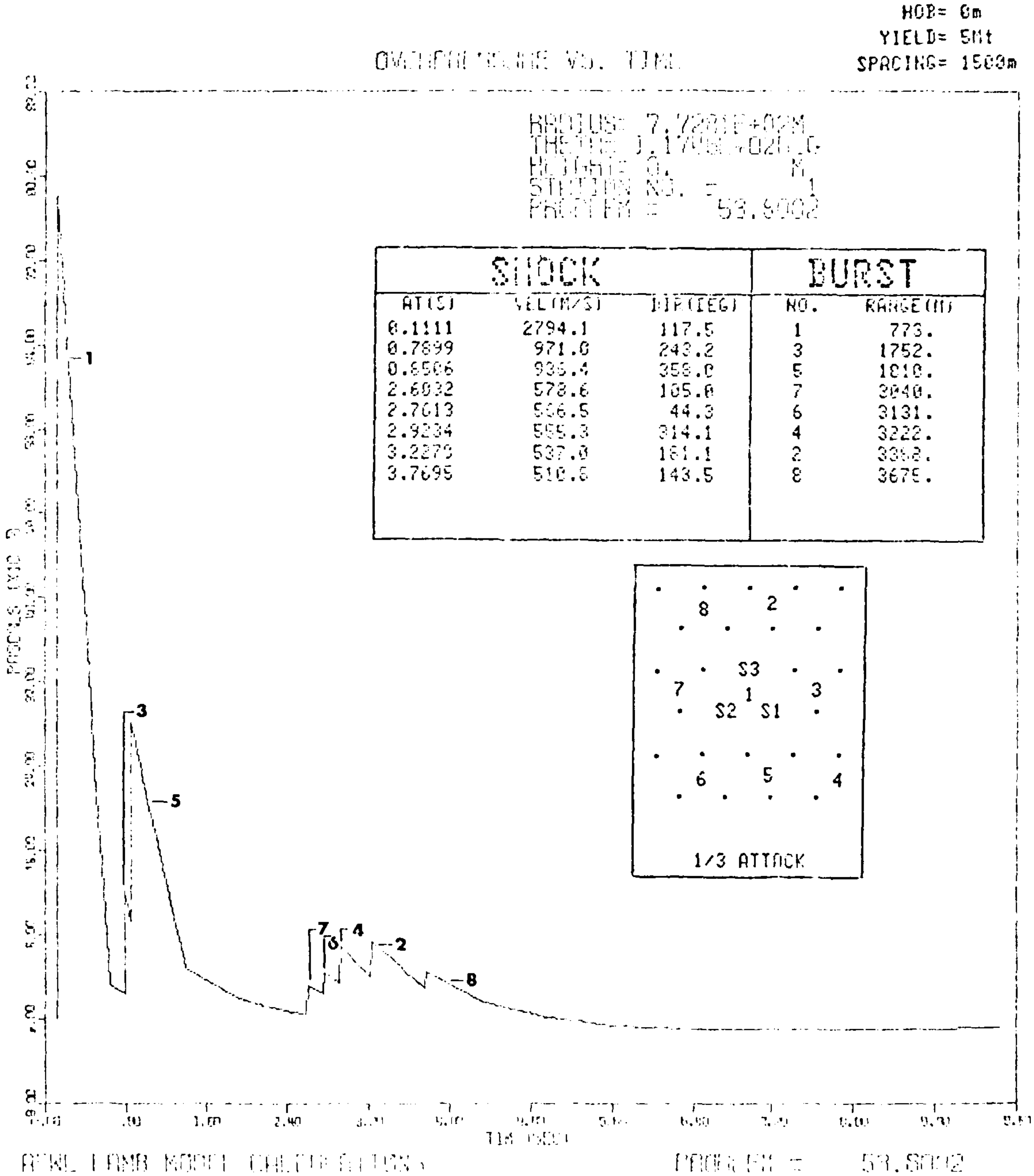
RADIUS= 4.8950E+02M
THETA= 3.5000E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 53.8001

SHOCK			BURST	
ATIME	VELOCITY	DIRECTION	NO.	FRAGLOAD
0.0036	5438.7	356.0	1	485.
0.5335	1184.6	62.4	7	1479.
0.5923	1122.3	277.2	3	1547.
0.6211	1095.3	142.3	8	1579.
0.6606	1058.7	199.2	2	1628.
1.0+59	841.2	344.5	5	1959.
1.6213	696.6	23.6	6	2417.
2.5481	563.2	317.4	4	3089.

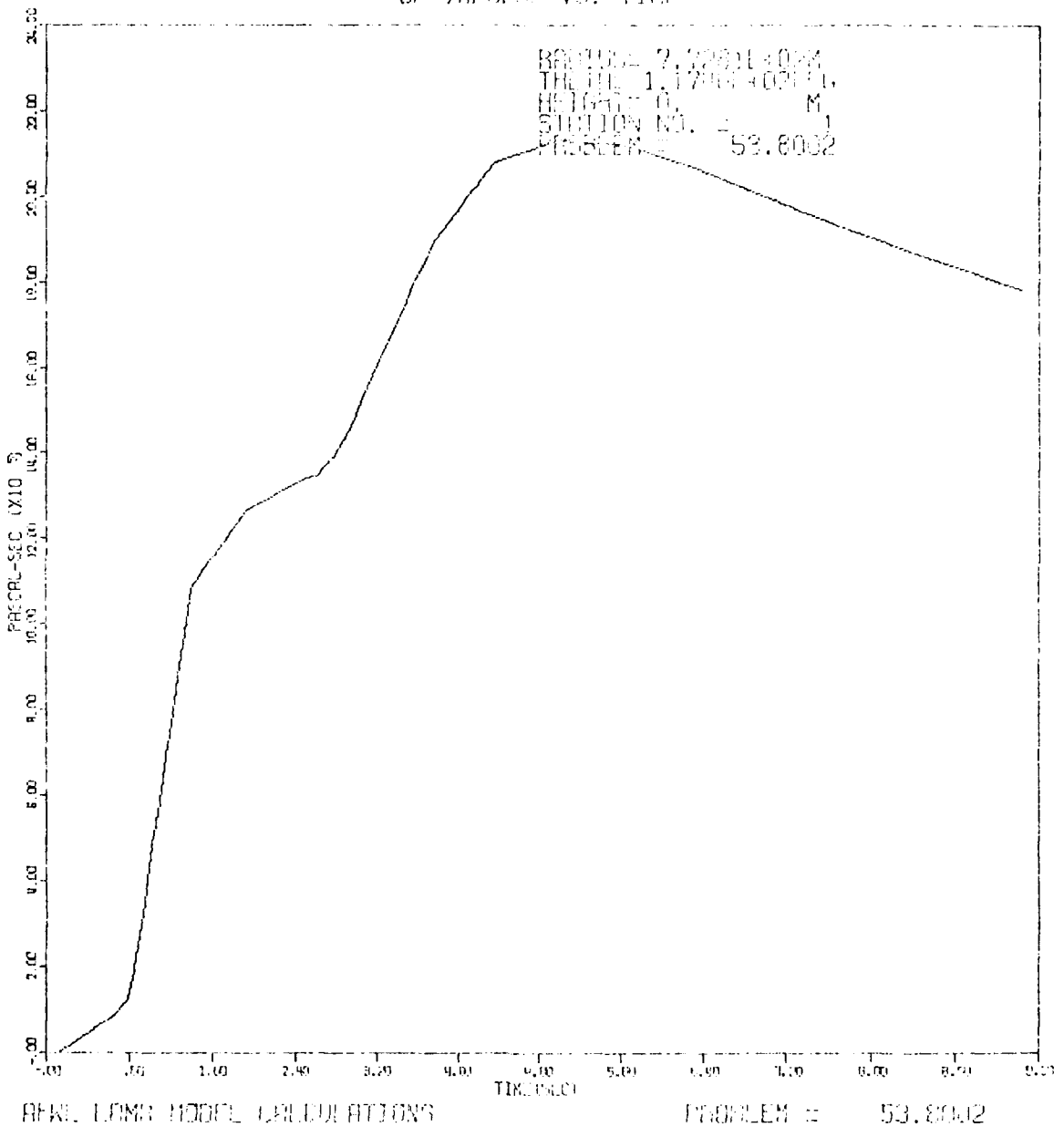


AFWL LASER MODEL CALCULATIONS PROBLEM = 53.8001


RADIUS= 4.8459E+021
TIME= 3.5035E+020EG
HEIGHT= 0. M
SUBITEM NO. = 3
PROBLEM = 53.8001
TIME (SEC)



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1111	2794.1	117.5	1	773.
0.7899	971.0	243.2	3	1752.
0.6506	935.4	358.0	5	1810.
2.6032	578.6	105.0	7	3040.
2.7613	566.5	44.3	6	3131.
2.9234	555.3	314.1	4	3222.
3.2279	537.0	161.1	2	3368.
3.7695	510.6	143.5	8	3675.

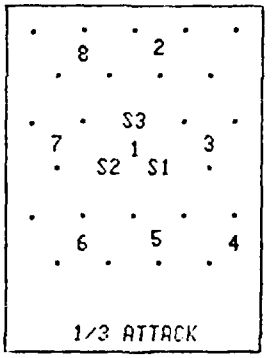

GP IMPROVE VS. TIME
PASCAL-SEC (X10 5)
TIME (SEC)
PROBLEM = 53.8002
REAL LONG MODEL CALCULATIONS
PROBLEM = 53.8002

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

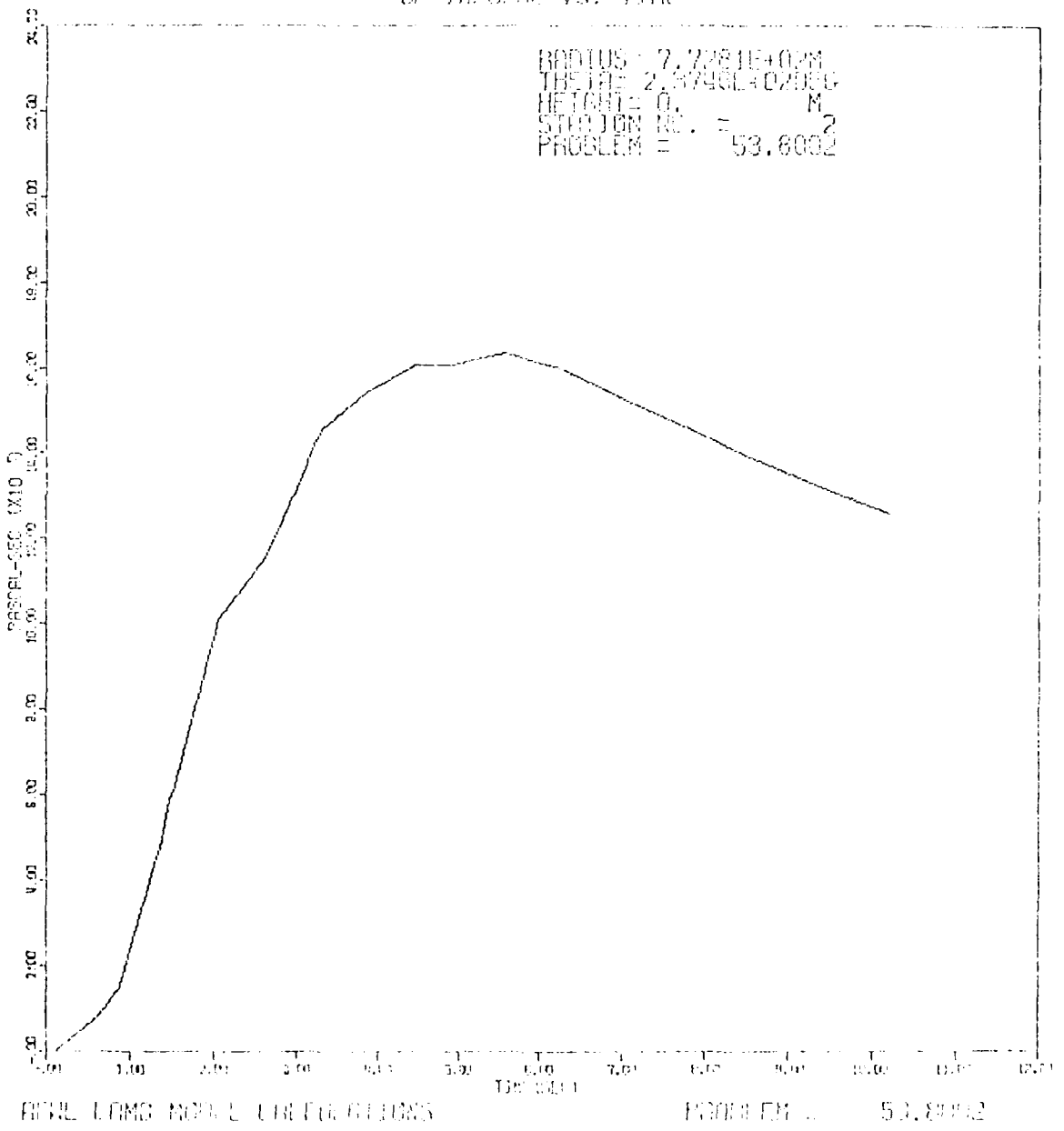
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
THETHE= 2.3740E+02DEG
RETARD= 0. M
STATION NO. = 2
PROBLEM = 53.8002

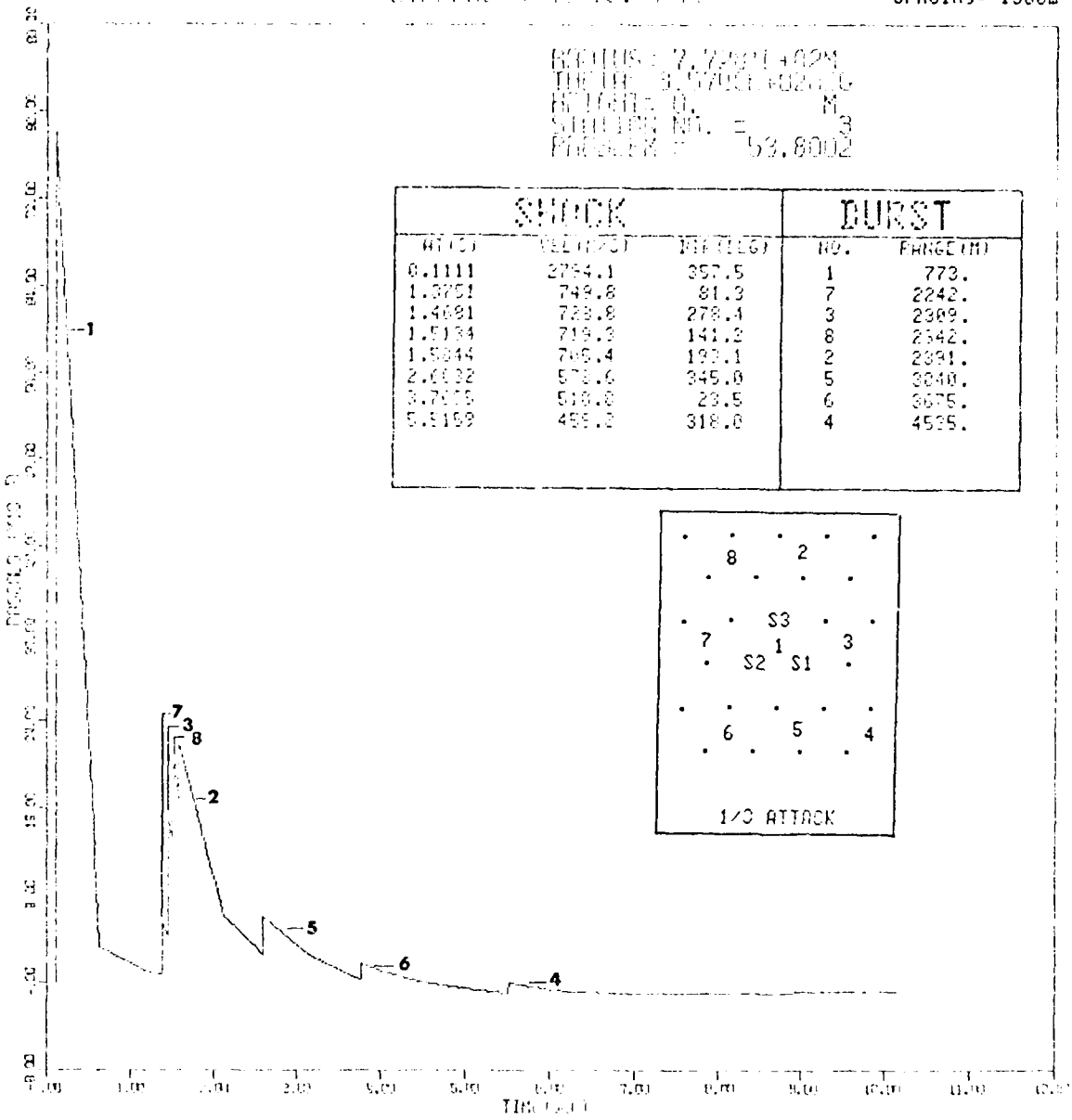
SHOCK			BURST	
ARRIV	VEL(M/ST)	DIR(DEG)	NO.	RANGE(M)
0.1111	2794.1	237.5	1	773.
0.6586	936.4	118.0	7	1810.
1.3851	749.8	321.3	5	2242.
1.5184	719.3	21.2	6	2342.
2.5243	581.0	253.7	3	3023.
2.7813	566.5	164.3	8	3131.
3.8579	507.1	202.1	2	3721.
4.9241	472.5	300.9	4	4254.



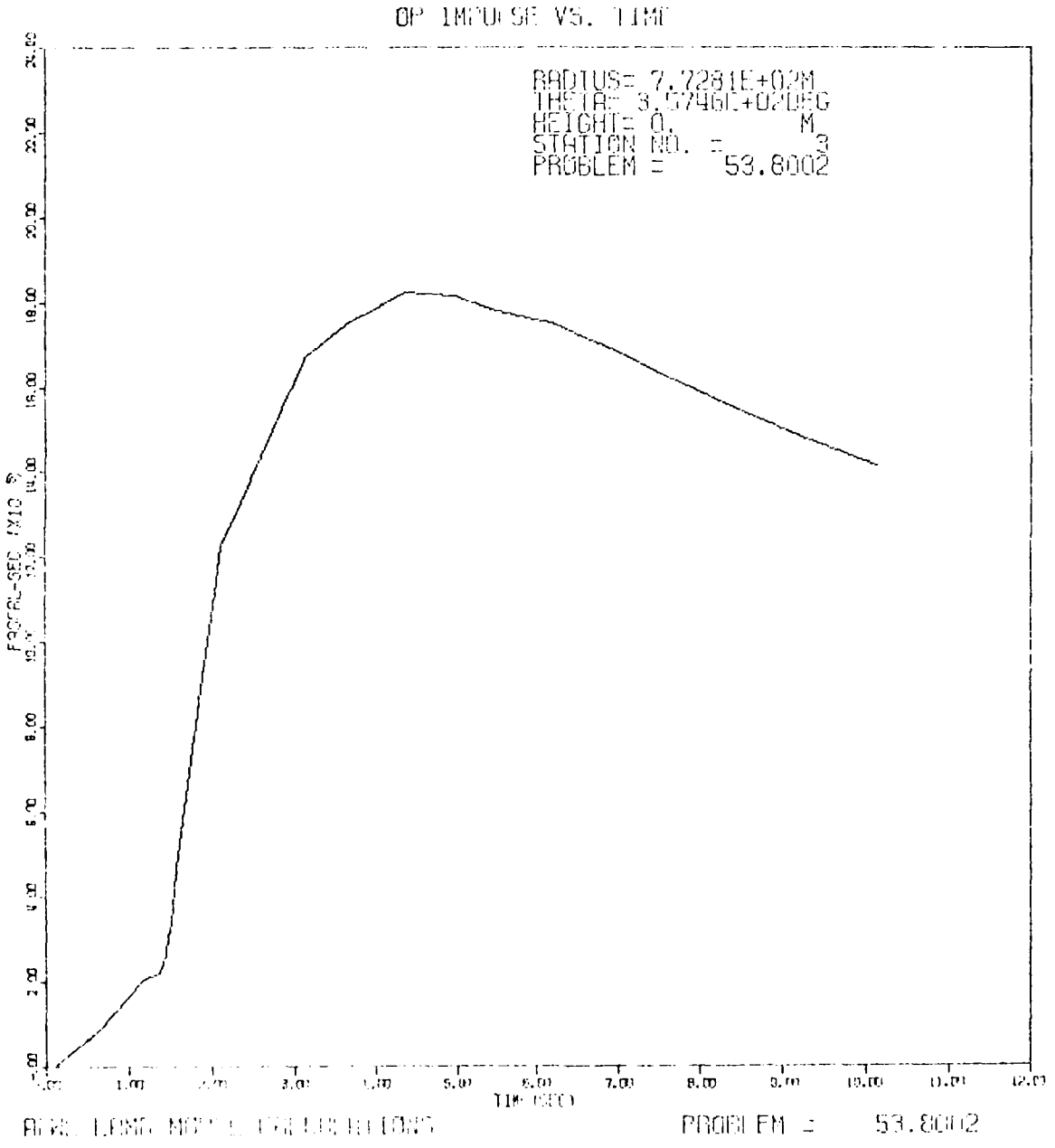
REAL TIME MODEL CALCULATIONS PROBLEM = 53.8002


RADIUS = 7.7281E+02M
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 53.6002

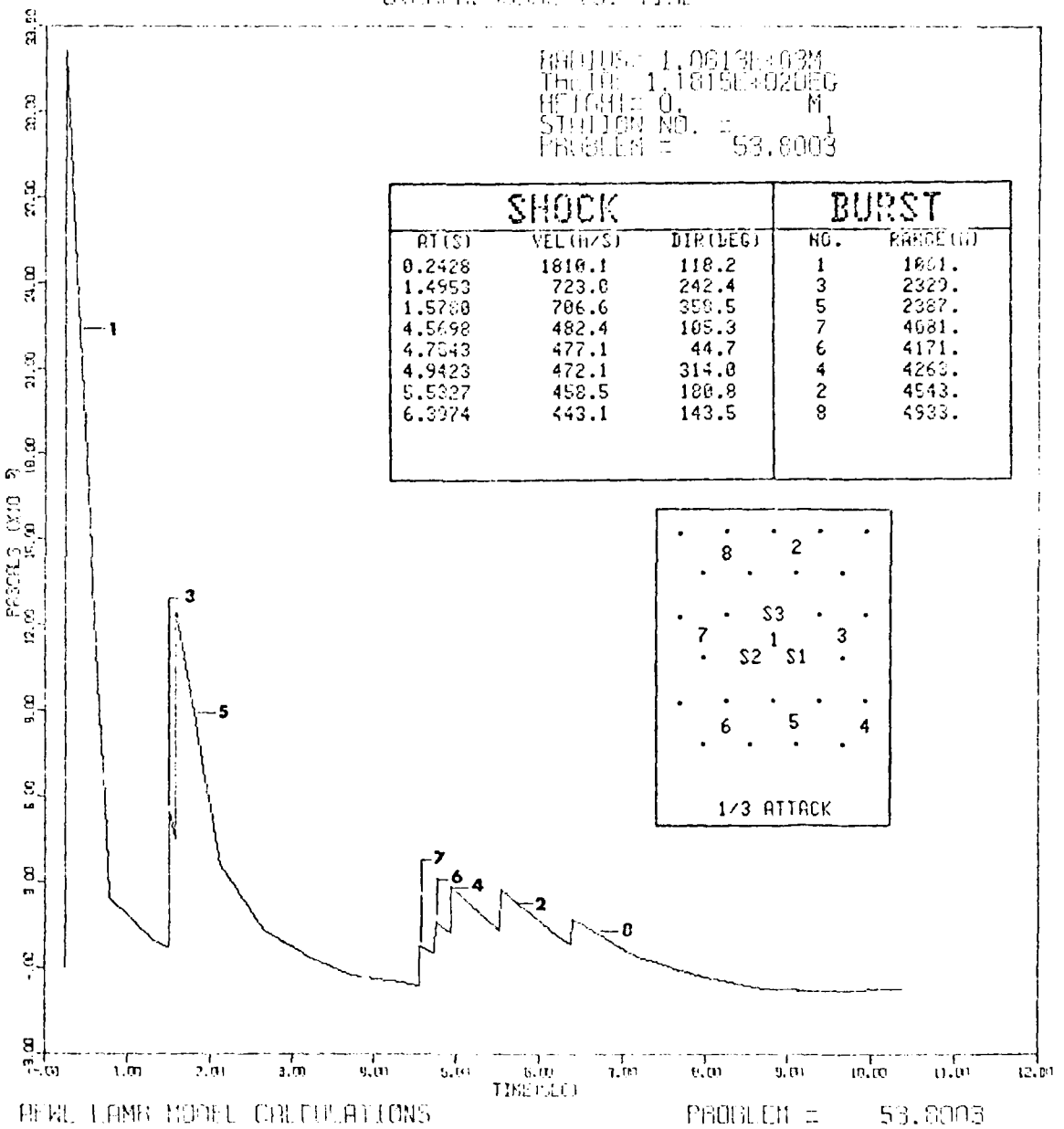
HOB= 0m
YIELD= 5Kt
SPACING= 1500m



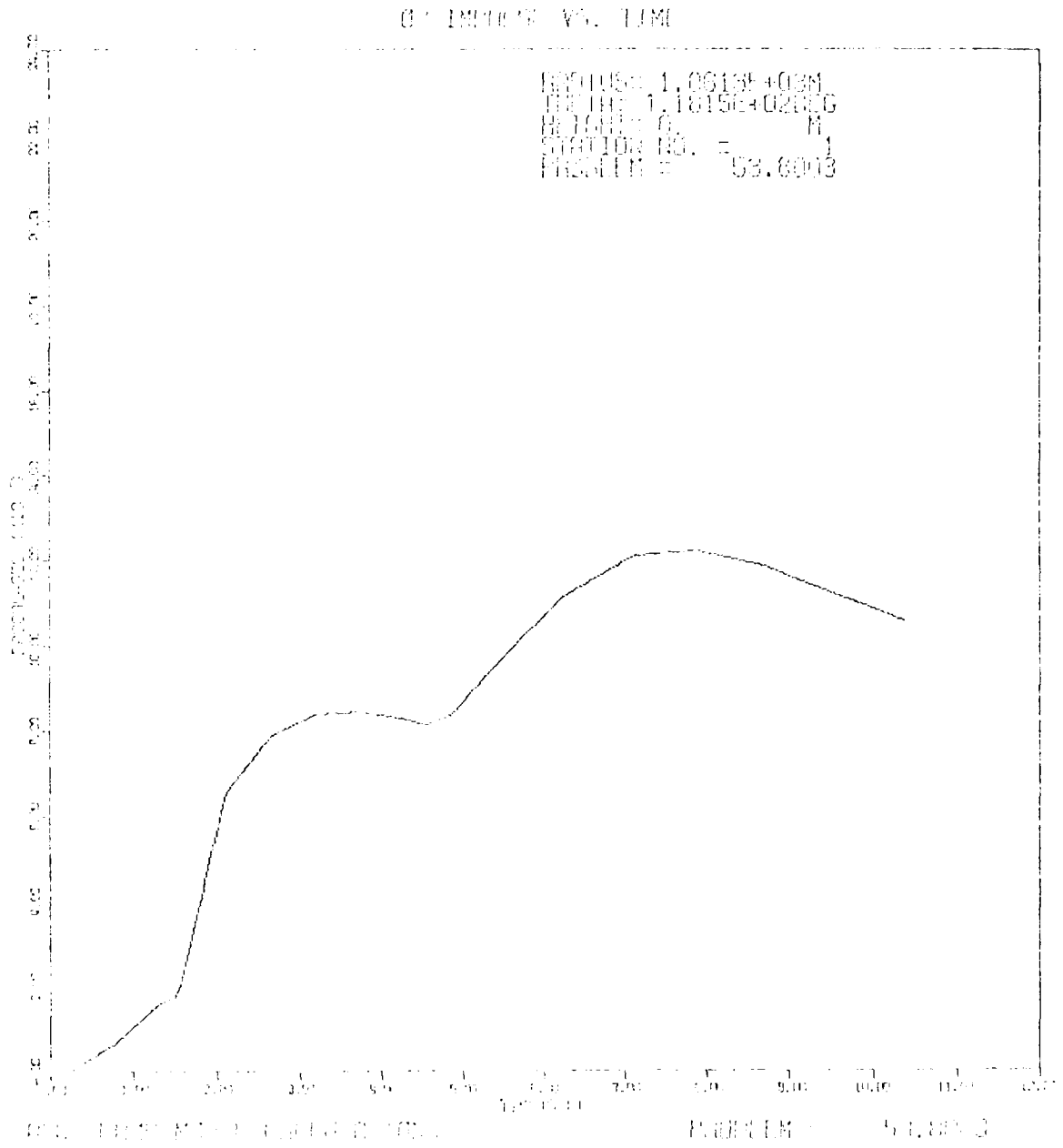
SHOCK			BURST	
MACH	VELOCITY	AZIMUTH	NO.	RANGE(M)
0.1111	2764.1	357.5	1	773.
1.3751	749.8	81.3	7	2242.
1.4081	728.8	278.4	3	2309.
1.5134	719.3	141.2	8	2642.
1.5844	746.4	193.1	2	2891.
2.0032	571.6	345.0	5	3840.
3.7275	516.0	23.5	6	3875.
5.8199	458.2	318.0	4	4525.


OP IMPULSE VS. TIME
RADIUS= 7.7281E+02M
THETA= 3.0746E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 53.8002
PROBLEM = 53.8002

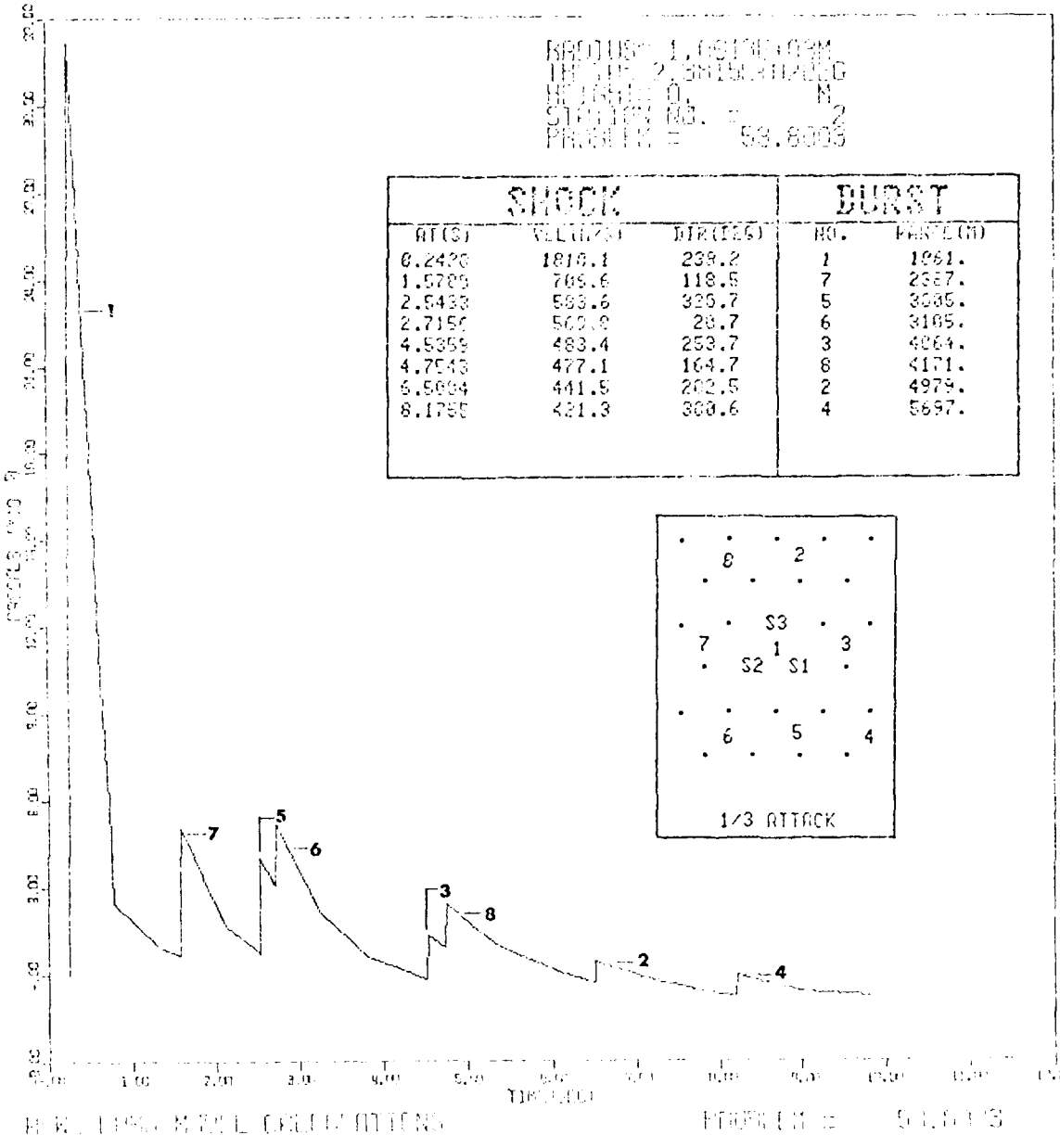
HOB= 0m
YIELD= 5Mt
SPACING= 2000m



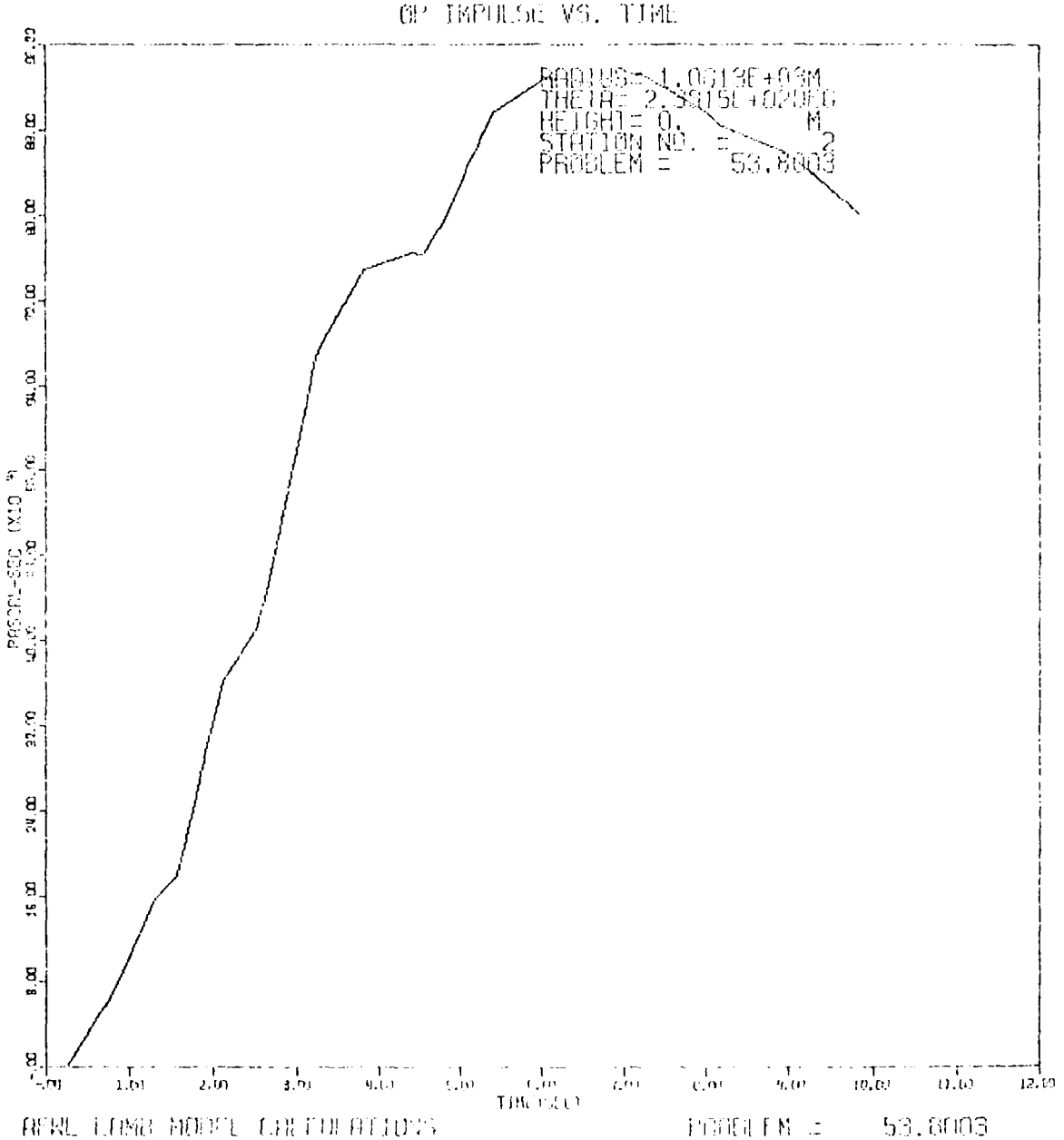
REAL LAMB MODEL CALCULATIONS PROBLEM = 53.0003


1.0619E+03M
1.1815E+02KG
M
1
53.6013

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

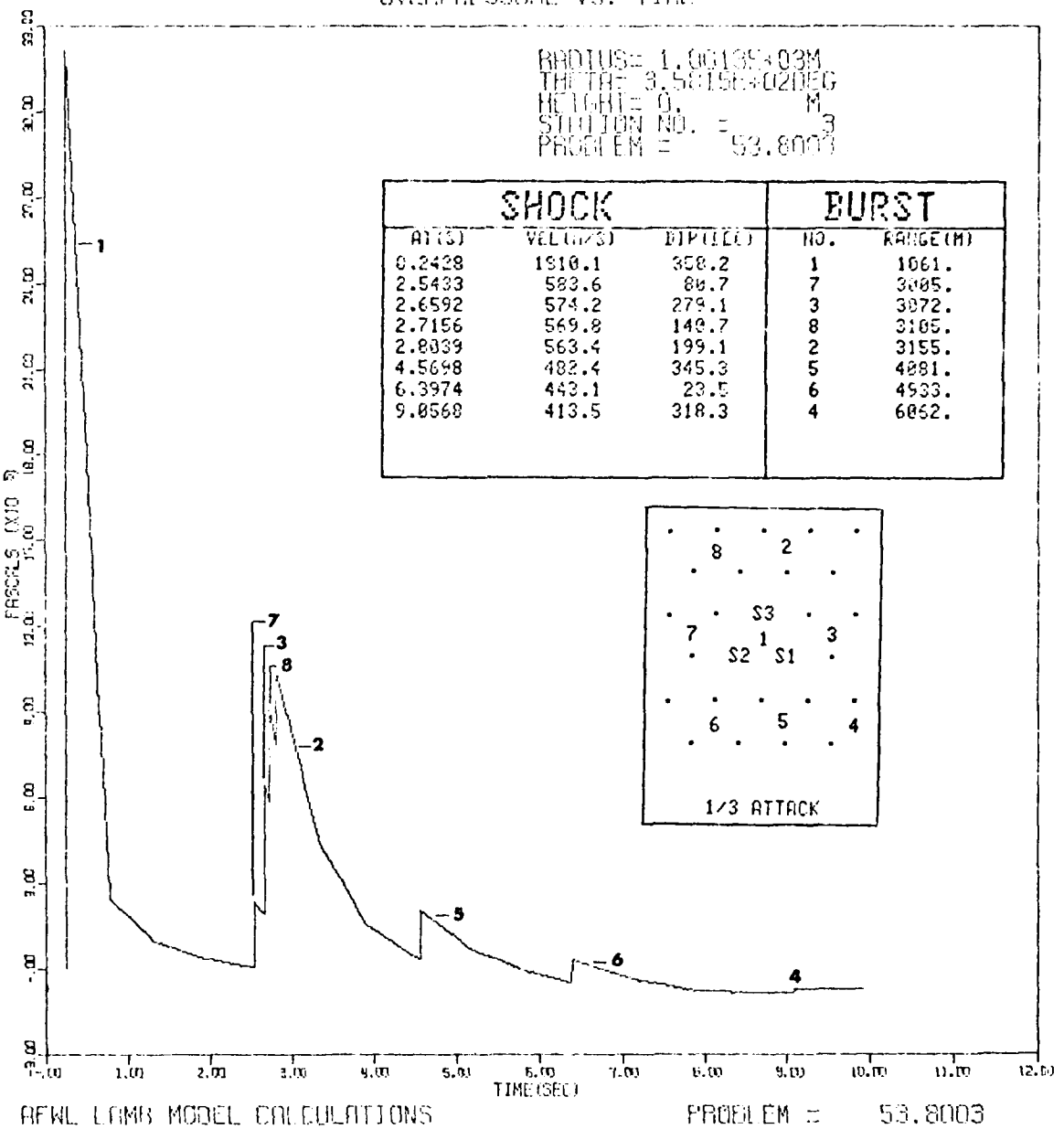


SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.2420	1810.1	239.2	1	1961.
1.5789	705.6	118.5	7	2387.
2.5433	583.6	329.7	5	3085.
2.7152	560.9	28.7	6	3165.
4.5359	483.4	253.7	3	4064.
4.7043	477.1	164.7	8	4171.
6.5694	441.5	202.5	2	4979.
8.1755	421.3	300.6	4	5697.

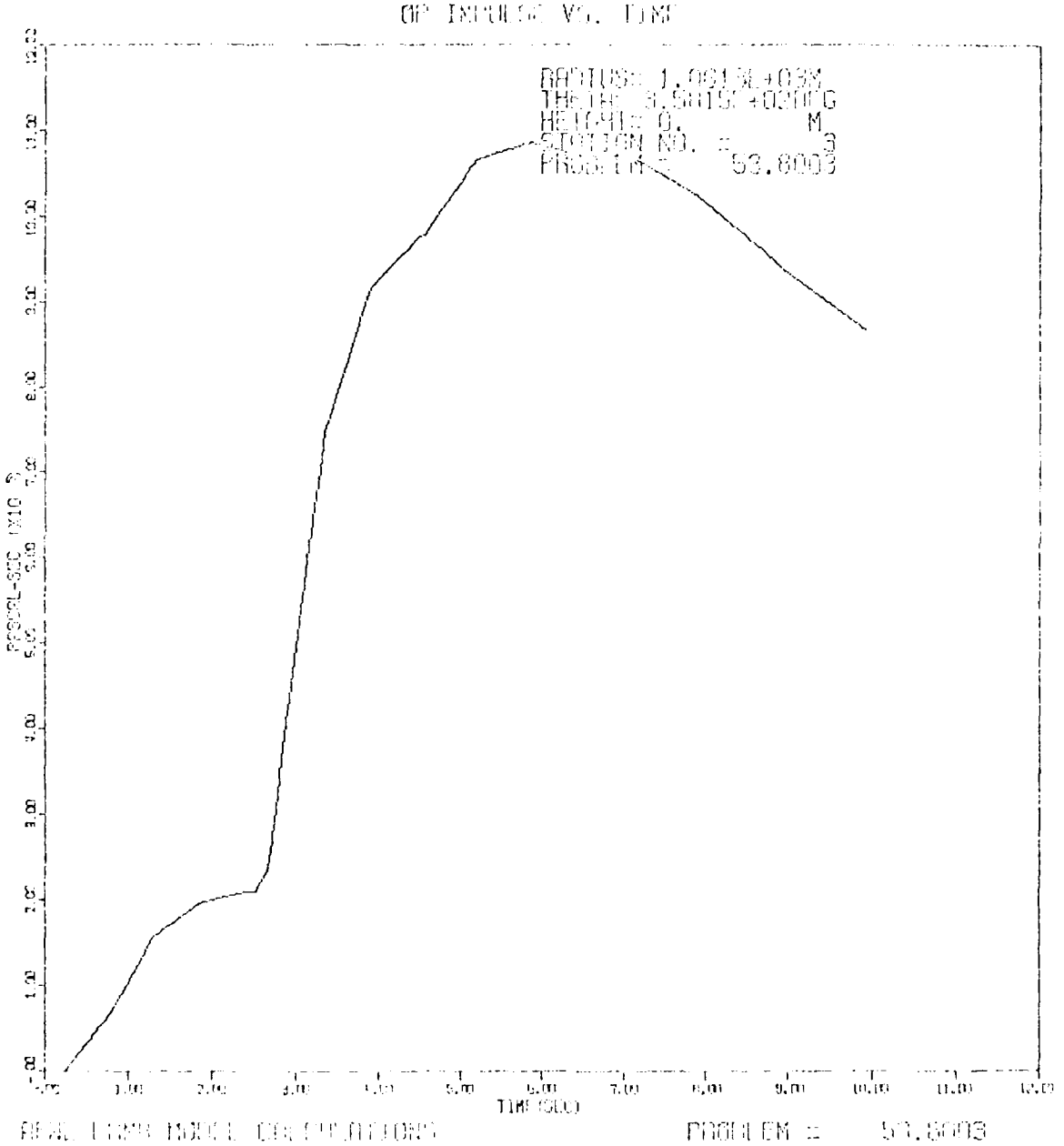

Ø' IMPULSE VS. TIME
RADIUS= 1.0513E+03M
THETA= 2.3915E+02DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 53.0003
PRESSURE-SEC (X10 **)
TIME (SEC)
0.00
8.00
16.00
24.00
32.00
40.00
48.00
56.00
64.00
72.00
80.00
88.00
96.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

OVERPRESSURE VS. TIME



AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.8003

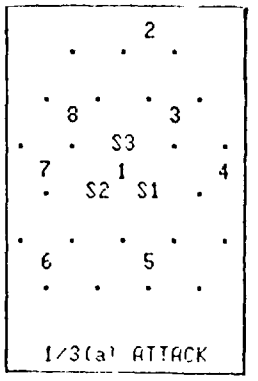

OP IMPULSE VS. TIME
RADIUS= 1.0918E+03M
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 53.8003
PRESSURE-SEC (X10 ^)
TIME (SEC)
REAL TIME MODEL OPERATIONS
PROBLEM = 53.8003

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

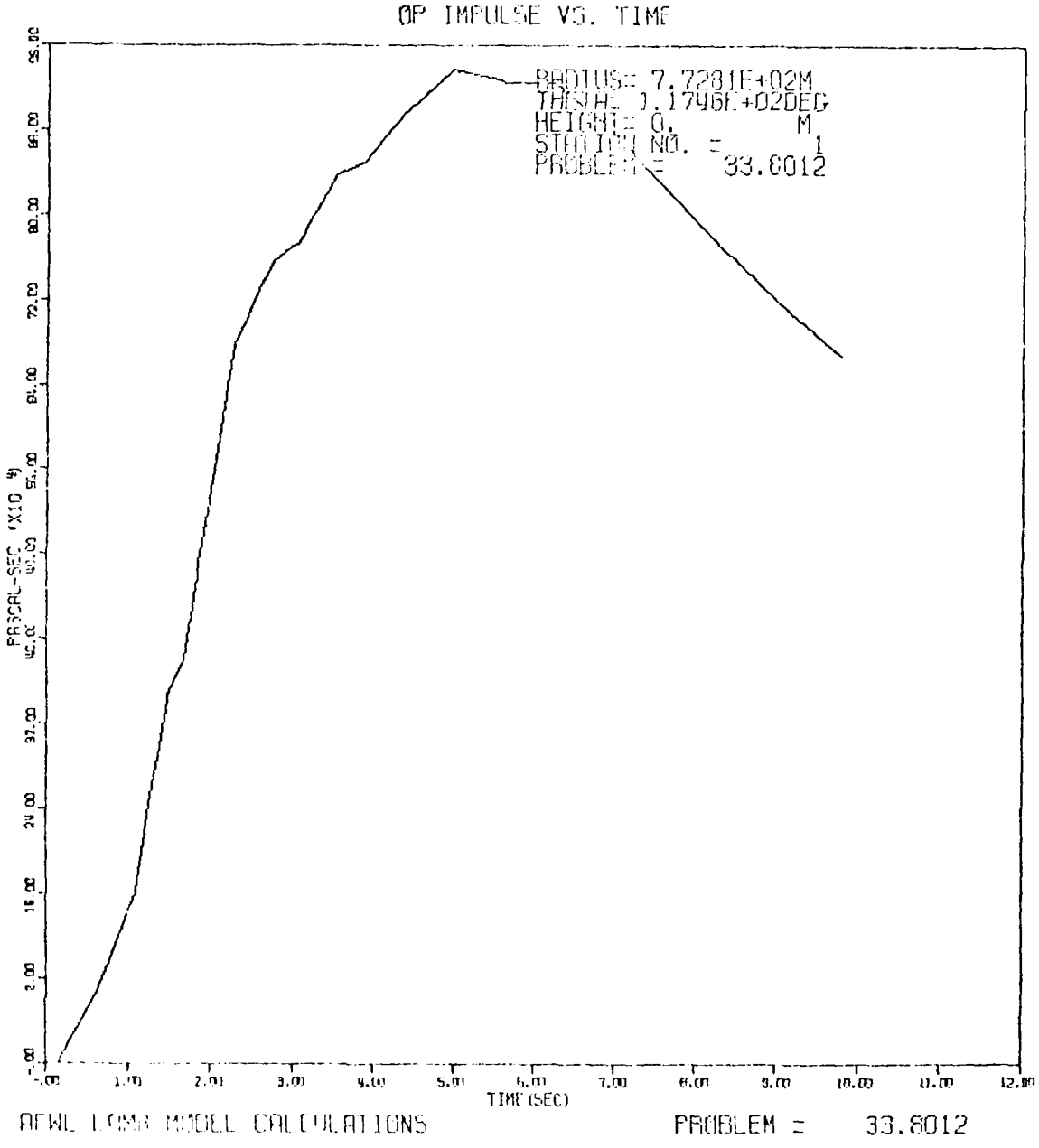
OVERPRESSURE VS. TIME

RADIUS= 7.2281E+03M
THETA= 1.1700E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8012

SHOCK			BURST	
ATT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1433	2287.5	117.5	1	773.
1.0528	783.6	358.0	5	1810.
1.6705	643.0	201.3	3	2242.
1.8354	620.3	261.2	4	2342.
3.8326	518.4	139.7	8	3023.
3.8672	491.9	58.4	6	3448.
4.2931	465.6	95.5	7	3703.
5.6068	439.5	180.9	2	4254.



AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.8012

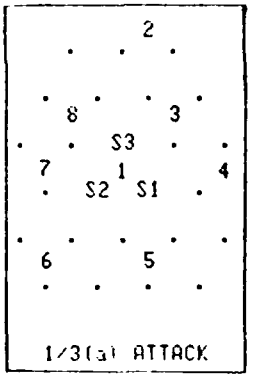

OP IMPULSE VS. TIME
RADIUS= 7.7281E+02M
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8012
PASCAL-SEC (X10 4)
TIME(SEC)
AFWL LOSS MODEL CALCULATIONS
PROBLEM = 33.8012

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

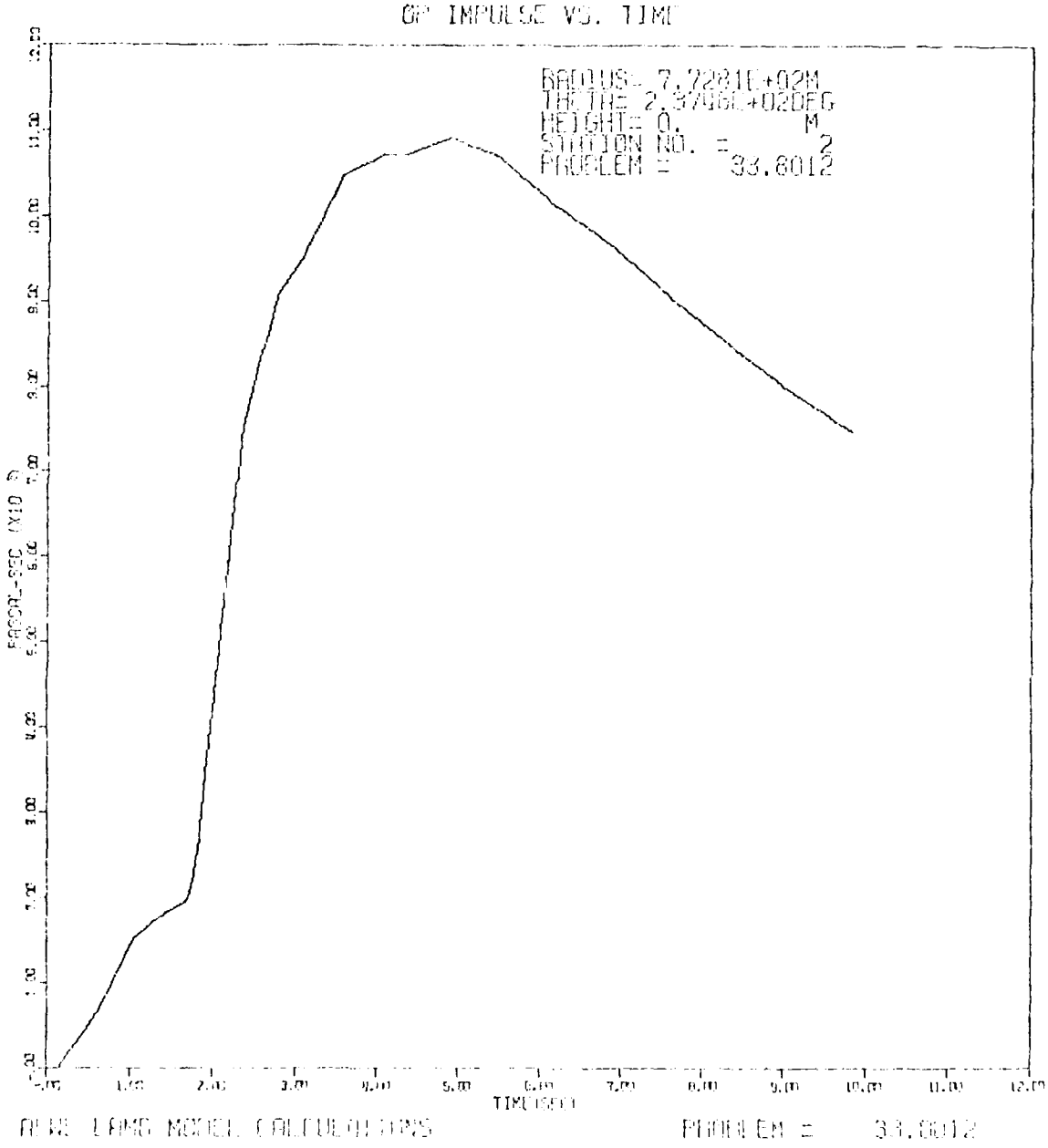
OVERPRESSURE VS. TIME

RADIUS= 7.7281E+02M
THETA= 2.3706E+02DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 33.8012

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2207.5	237.5	1	773.
1.6765	643.0	321.3	5	2242.
1.7886	627.3	158.4	8	2389.
1.8820	614.5	42.4	6	2370.
1.9020	611.3	100.0	7	2385.
3.0649	516.7	225.8	3	3040.
4.3345	467.2	263.5	4	3675.
6.2555	429.4	198.0	2	4535.

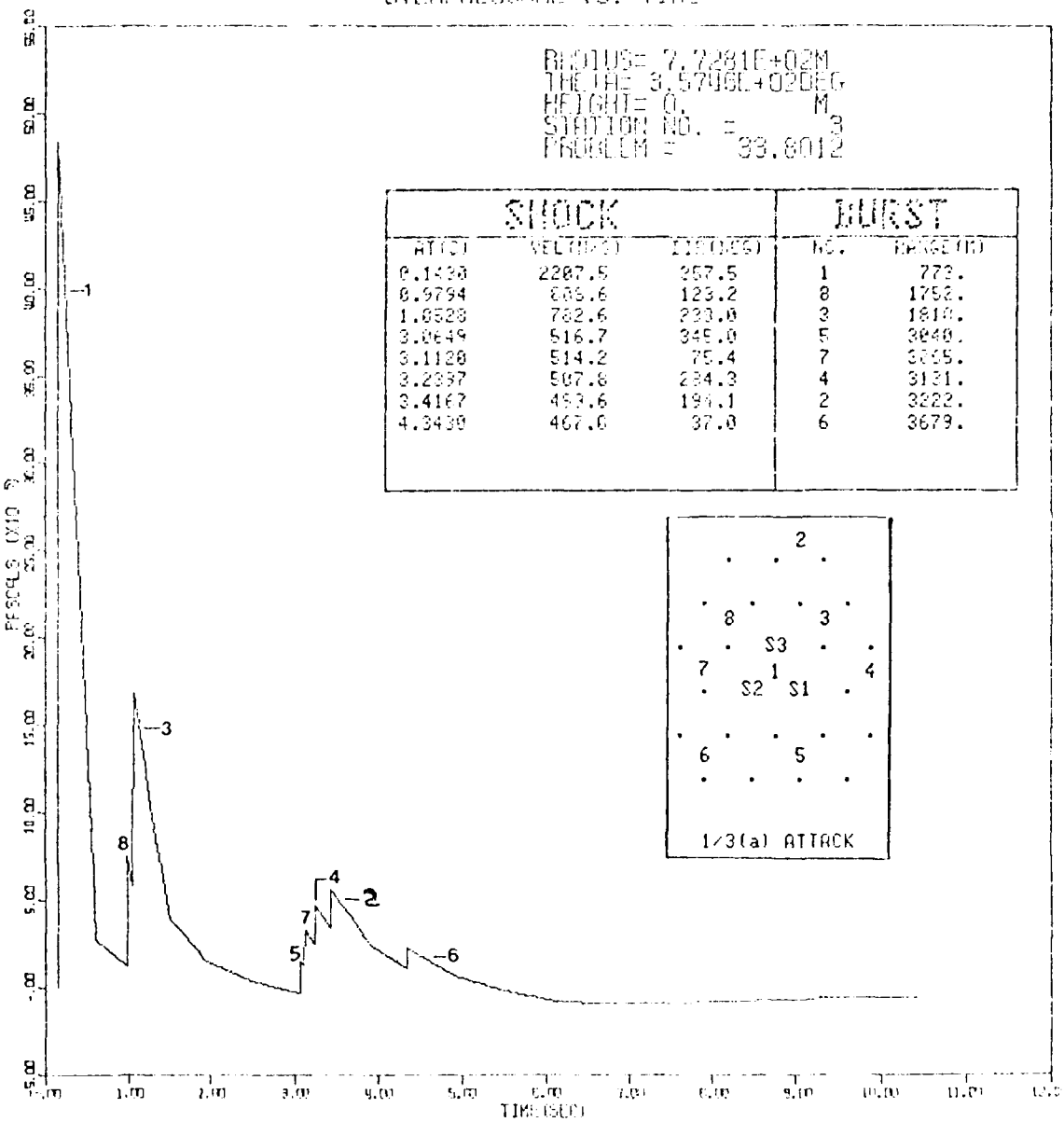


AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.8012


GP IMPULSE VS. TIME
RADIUS= 7.7281E+02M
THETHE= 2.3700E+02DEG
HEIGHT= 0. M
STATION NO. = 2
PROBLEM = 33.8012
PARCEL-SEC (X10 P
TIME(SEC)
NEW LAMB MODEL CALCULATIONS
PROBLEM = 33.8012

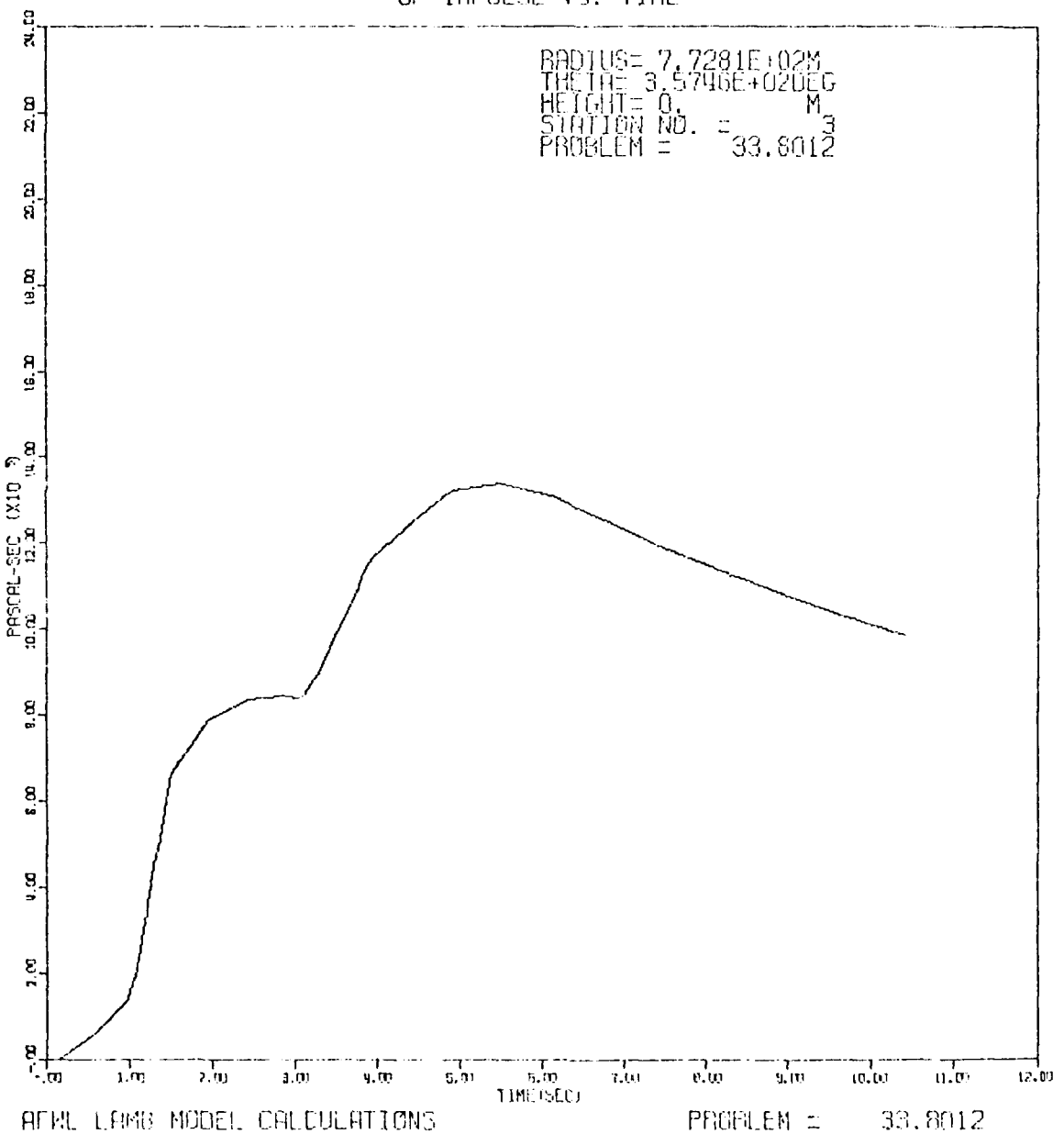
HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



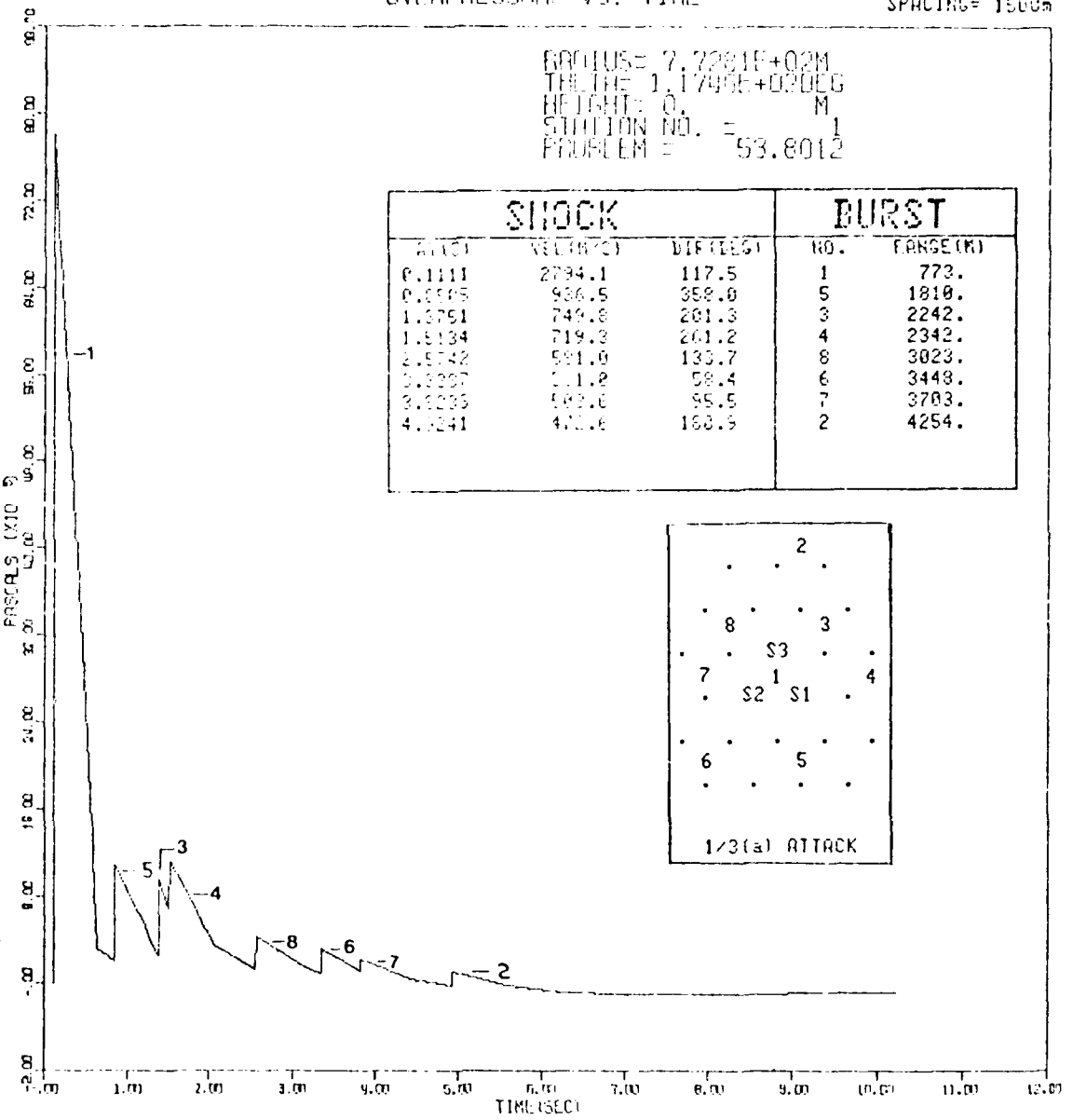
SHOCK			BURST	
ATT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1430	2287.5	257.5	1	773.
0.9794	886.6	123.2	8	1752.
1.0528	782.6	233.0	3	1814.
3.0649	516.7	345.0	5	3040.
3.1128	514.2	75.4	7	3095.
3.2397	507.8	284.3	4	3131.
3.4167	498.6	194.1	2	3222.
4.3438	467.0	37.0	6	3679.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.8012


OP IMPULSE VS. TIME
RADIUS= 7.7281E+02M
THETA= 3.5746E+02DEG
HEIGHT= 0. M
STATION NO. = 3
PROBLEM = 33.8012
PASCAL-SEC (X10 **)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 33.8012

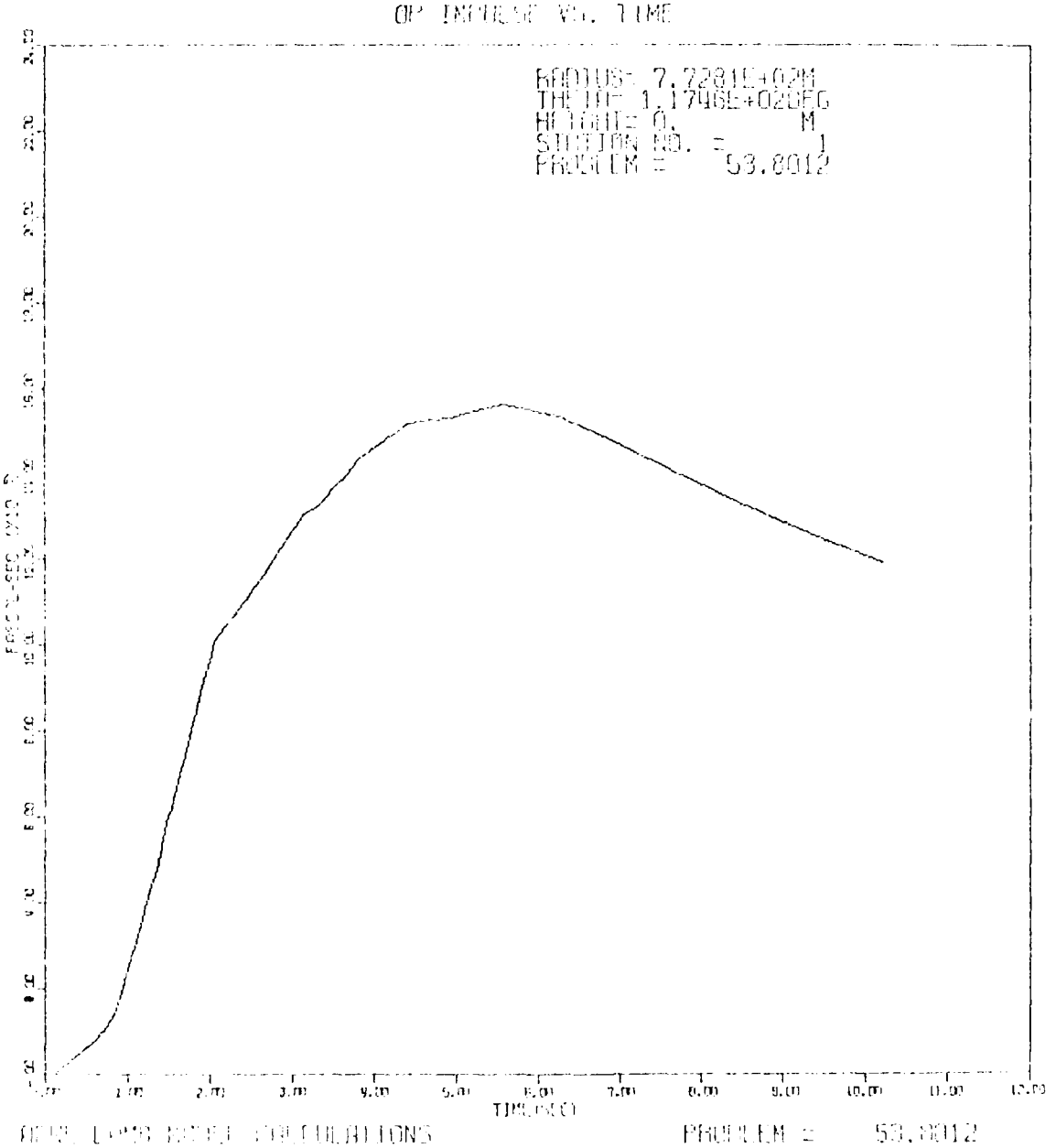
HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



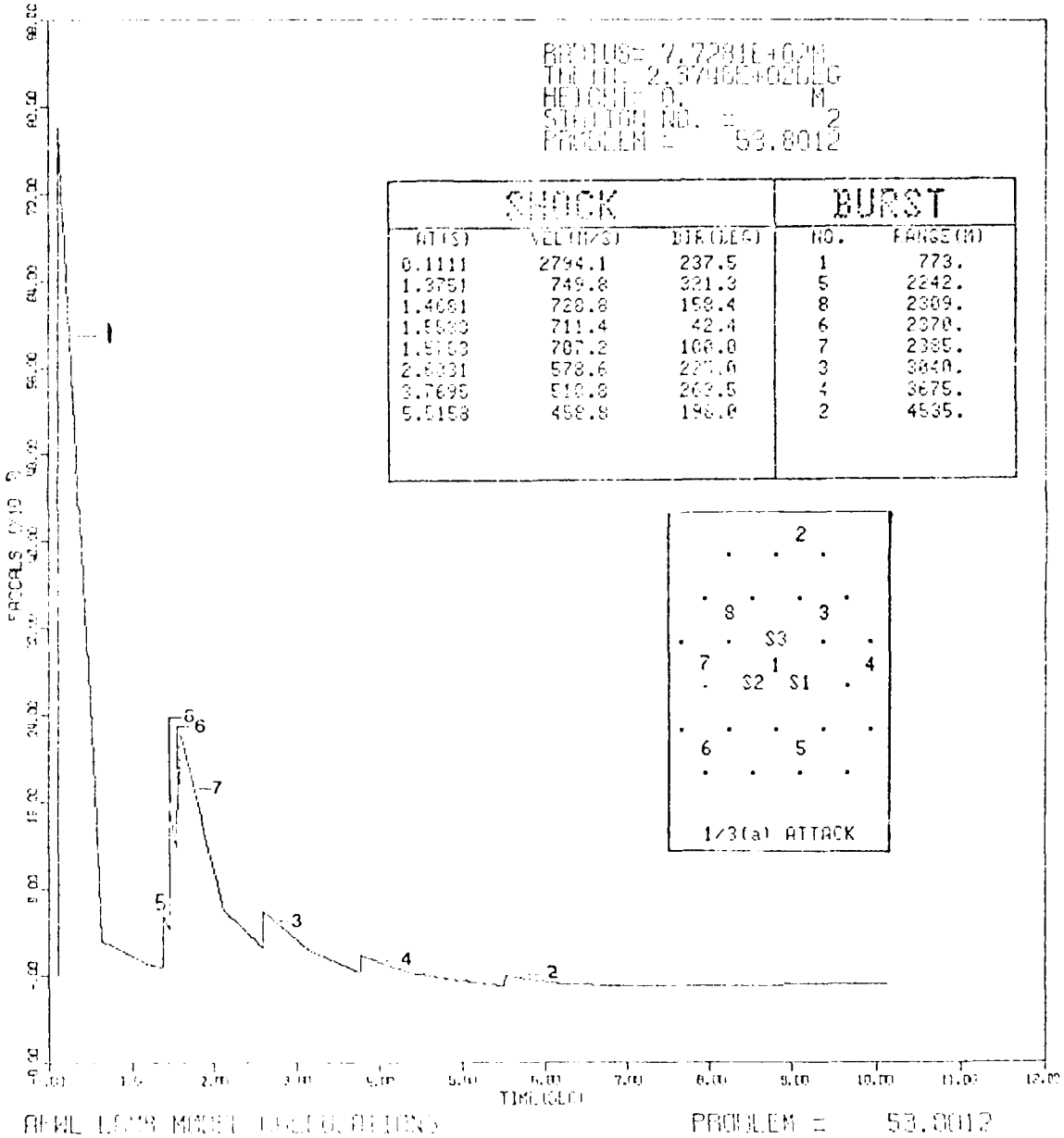
SHOCK			BURST	
A(I)	V(I)(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1111	2784.1	117.5	1	773.
0.2595	936.5	358.0	5	1810.
1.3751	749.8	201.3	3	2242.
1.5134	719.3	201.2	4	2342.
2.5742	591.0	133.7	8	3023.
3.3397	511.2	58.4	6	3448.
3.6036	489.6	55.5	7	3703.
4.0241	472.6	180.9	2	4254.

AFWL TOMB MODEL CALCULATIONS PROBLEM = 53.8012


RADIUS= 7.2281E+02M
THETA= 1.1740E+02DEG
HEIGHT= 0. M
SECTION NO. = 1
PROBLEM = 53.8012
TIME(SEC)

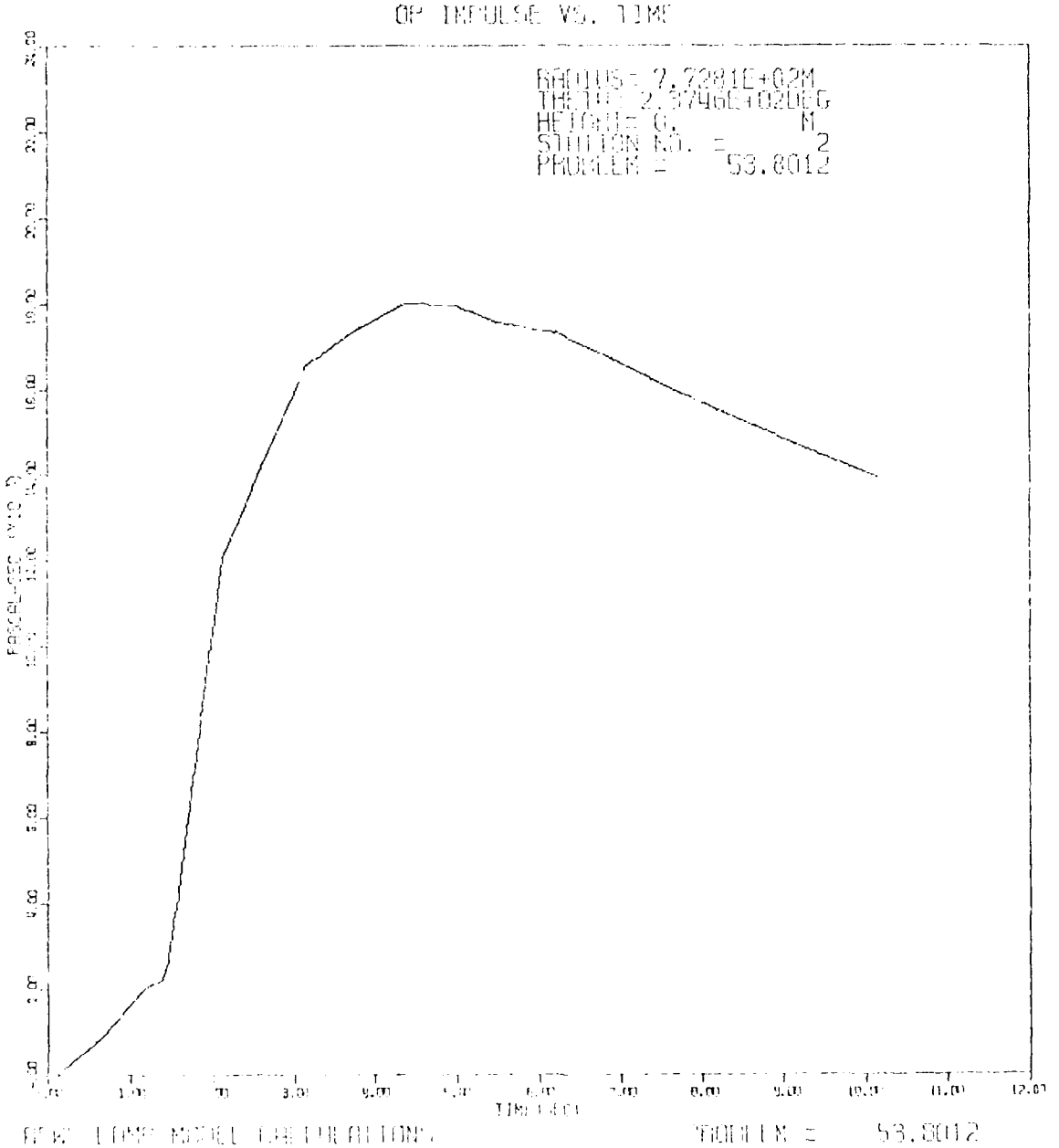
HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



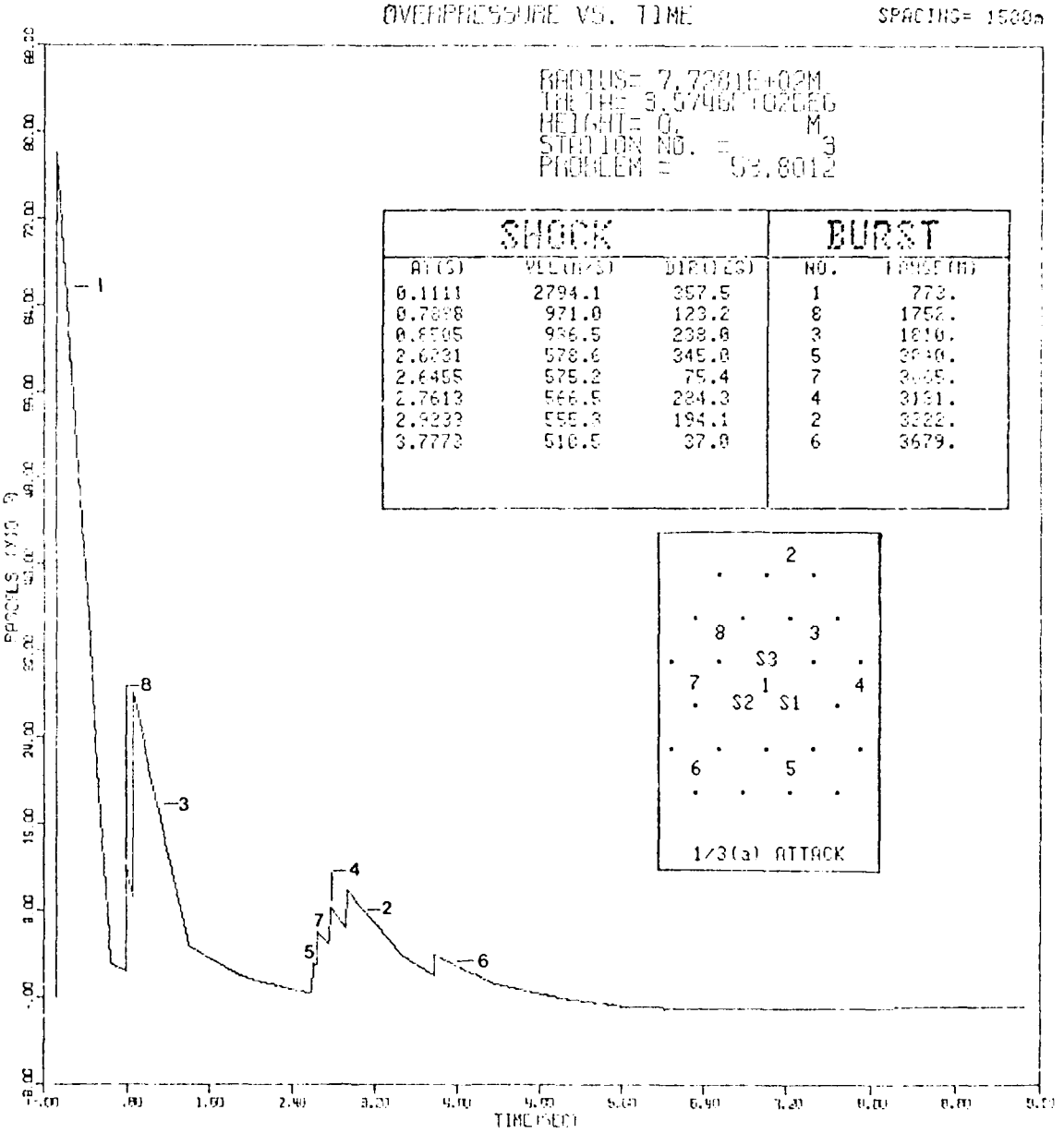
SHOCK			BURST	
ATT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1111	2794.1	237.5	1	773.
1.3751	749.8	321.3	5	2242.
1.4681	728.8	158.4	8	2309.
1.5589	711.4	42.4	6	2370.
1.5763	707.2	100.0	7	2385.
2.8031	578.6	279.6	3	3840.
3.7695	518.8	203.5	4	3675.
5.5153	458.8	196.0	2	4535.

AERIAL BURST MODEL CALCULATIONS PROBLEM = 53.0012

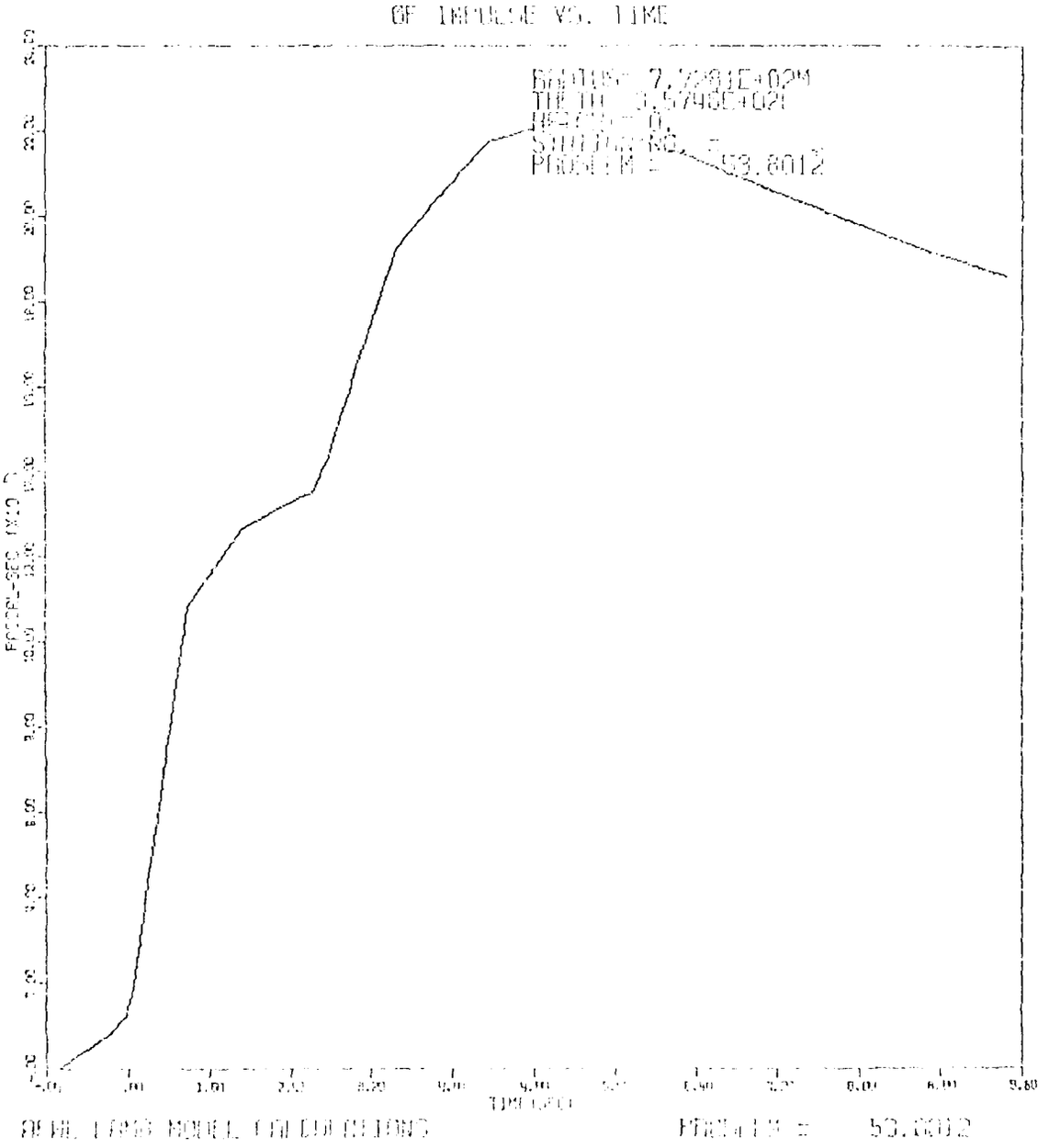

DP IMPULSE VS. TIME
RADIUS = 7.2281E+02M
THETA = 2.5746E+02DEG
HEIGHT = 0. M
STATION NO. = 2
PROBLEM = 53.8012
PROBLEM = 53.8012

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.8012

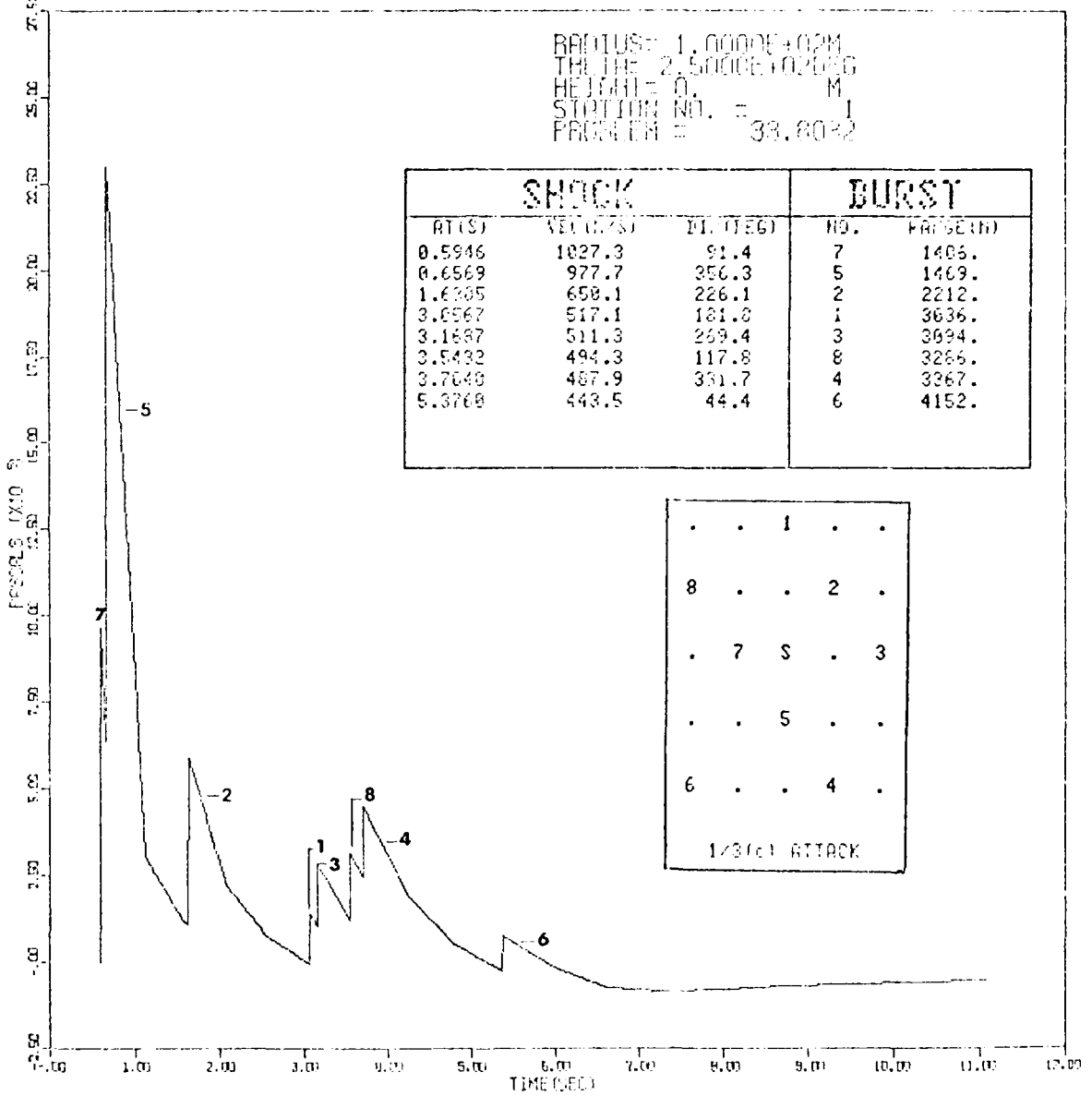

OF IMPULSE VS. TIME
PROGRAM = 53.8012
TIME (SEC)

HOB= 0m
YIELD= 3Mt
SPACING= 1500m

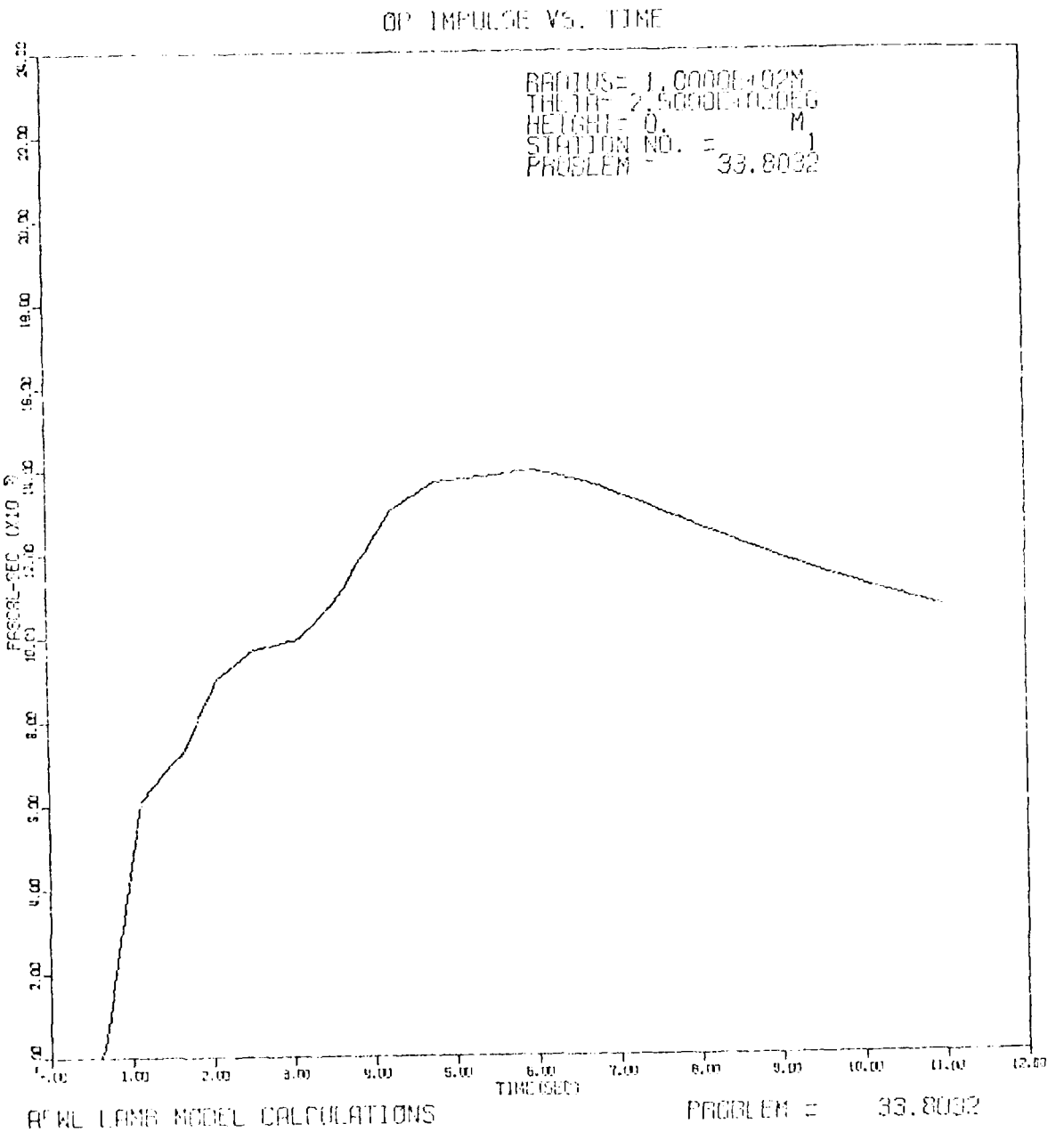
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
TIME= 2.5000E+02SEC
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8032

SHOCK			BURST	
AT(S)	VEL(M/S)	DI.(DEG)	NO.	RANGE(M)
0.5946	1027.3	91.4	7	1406.
0.6569	977.7	356.3	5	1469.
1.6305	658.1	226.1	2	2212.
3.0567	517.1	181.8	1	3636.
3.1687	511.3	269.4	3	3694.
3.5432	494.3	117.8	8	3266.
3.7049	487.9	331.7	4	3367.
5.3768	443.5	44.4	6	4152.



AFWL IAMS MODEL CALCULATIONS PROBLEM = 33.8032

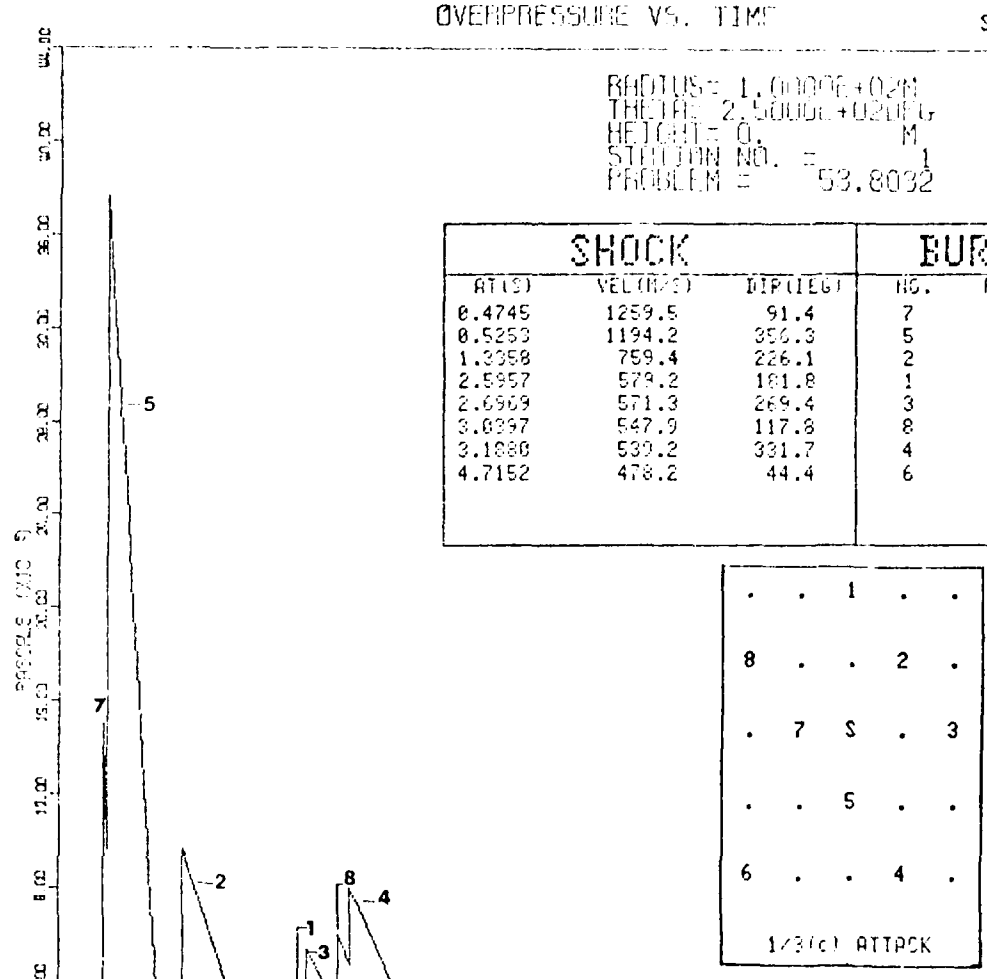

OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.5000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.8032
PASCAL-SEC (X10 **)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 33.8032

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

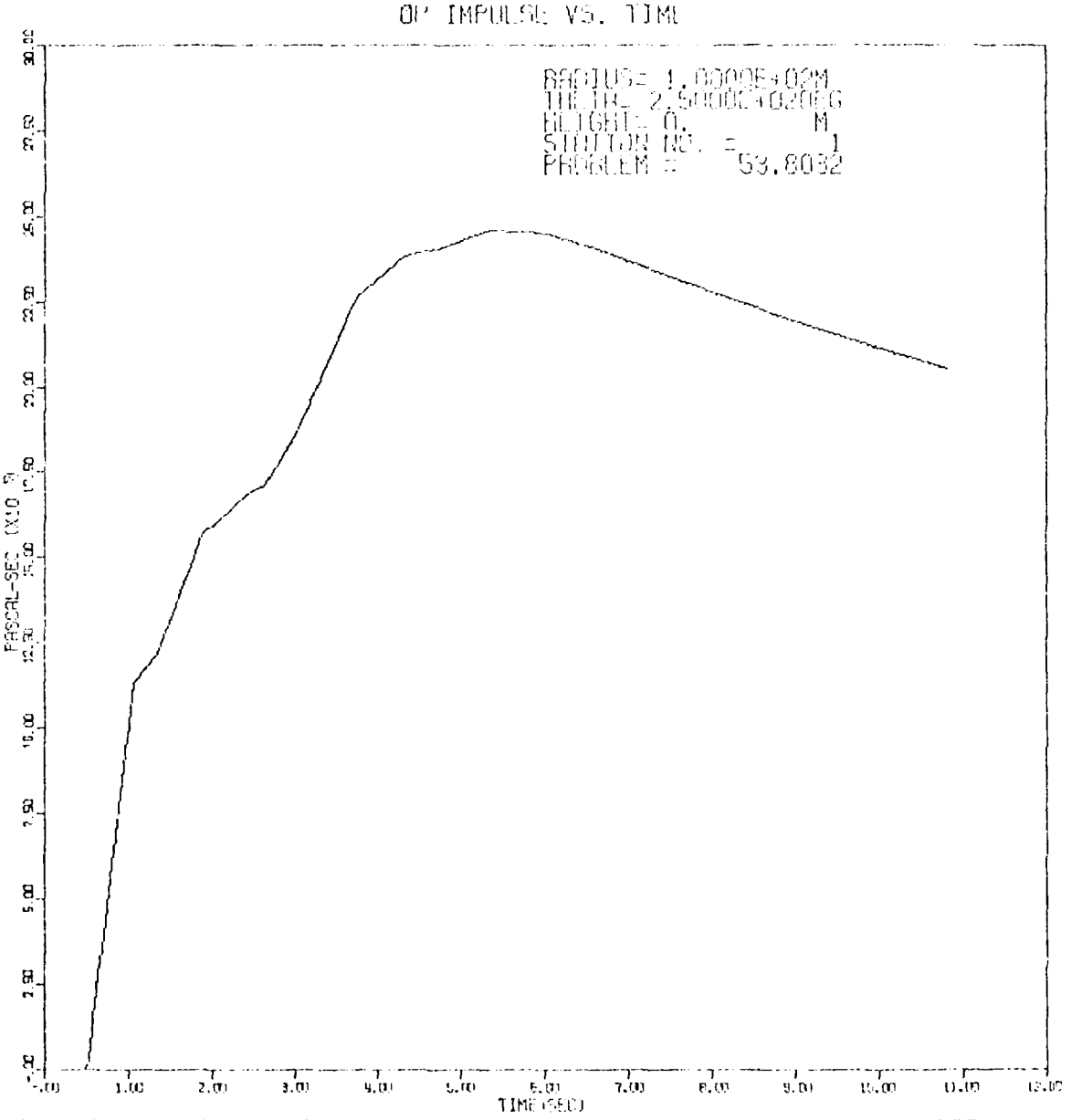
OVERPRESSURE VS. TIME

RADIUS= 1.000000+02M
THETA= 2.500000+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.8032

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.4745	1259.5	91.4	7	1406.
0.5253	1194.2	356.3	5	1469.
1.3358	759.4	226.1	2	2212.
2.5957	579.2	181.8	1	3036.
2.6909	571.3	269.4	3	3094.
3.0397	547.9	117.8	8	3286.
3.1080	539.2	331.7	4	3367.
4.7152	478.2	44.4	6	4152.



AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.8032

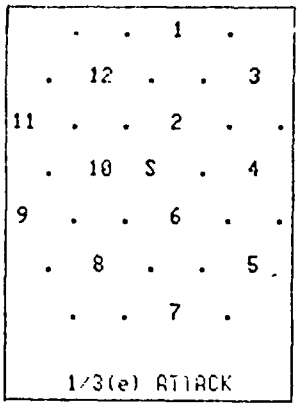

OF IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.5000E+020DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.8032
PASCAL-SEC (X10 **)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 53.8032

HOB= 0m
YIELD= 3Mt
SPACING= 1000m

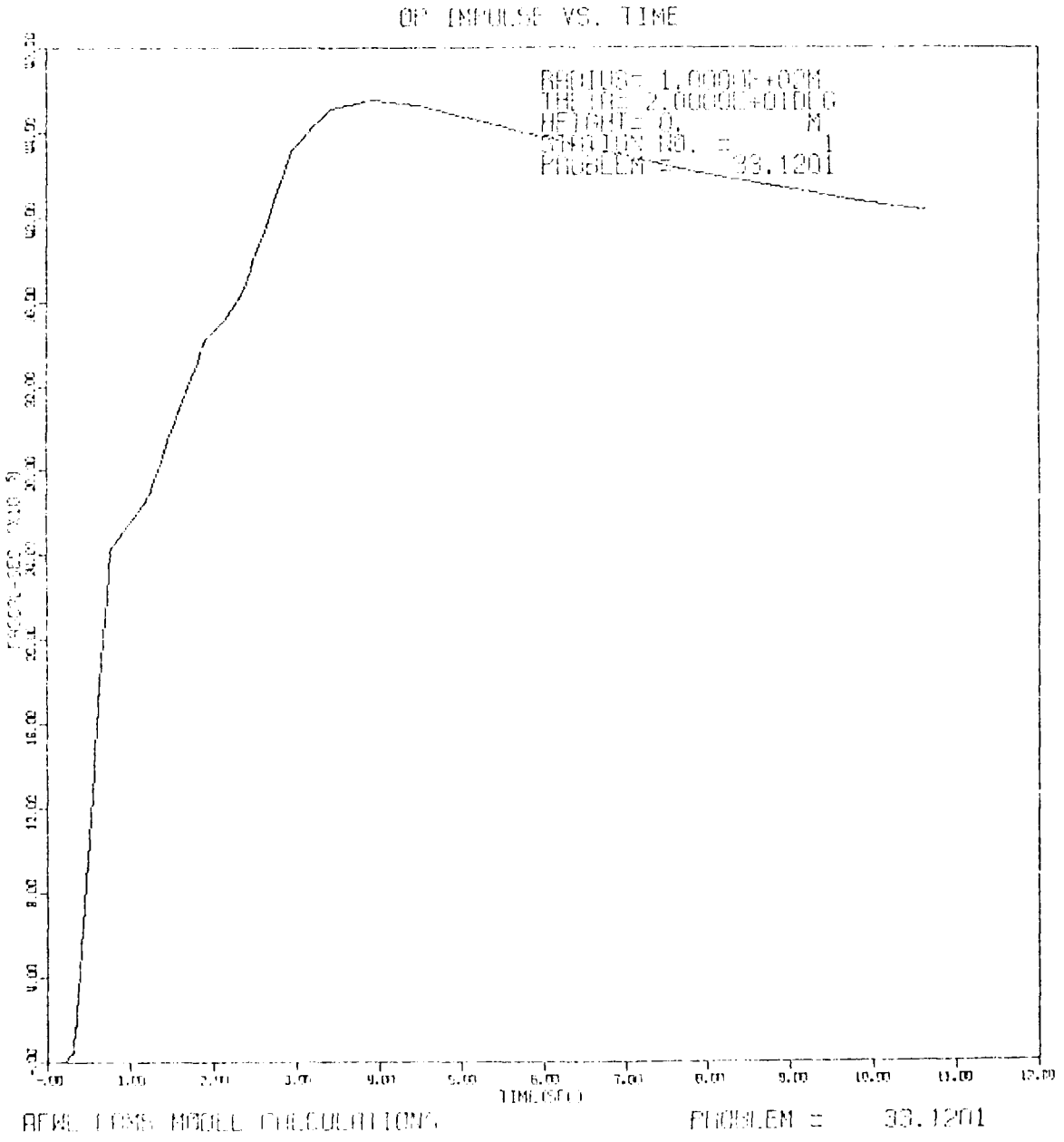
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
TAGTIME= 2.0000E+01SEC
HEIGHT= 0. M
STRUCTURE NO. = 1
PROBLEM = 33.1201

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.2005	1792.5	211.1	2	902.
0.2926	1409.8	84.8	10	1038.
0.3121	1403.9	334.1	6	1067.
1.2237	732.5	147.7	12	1937.
1.3667	721.7	272.7	4	1908.
1.4563	650.6	29.5	8	2089.
2.1665	591.5	190.5	1	2547.
2.1966	578.5	340.2	3	2559.
2.3433	565.2	106.9	11	2649.
2.4039	560.2	312.9	5	2683.
2.4528	556.3	64.2	9	2710.
2.4818	553.3	359.2	7	2732.

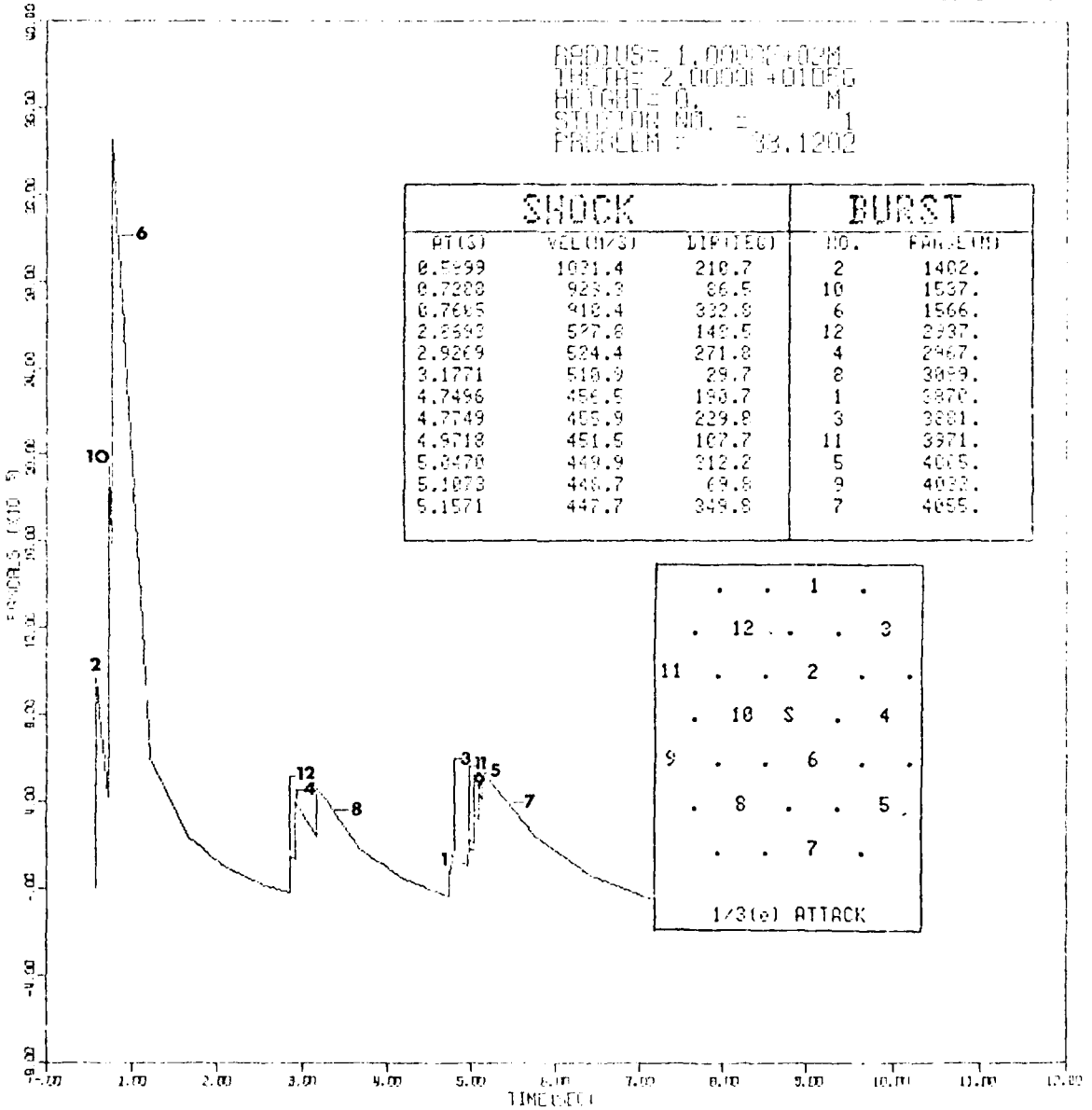


AFWL LAMS MODEL CALCULATIONS PROBLEM = 33.1201


OF IMPULSE VS. TIME
RADIUS= 1.0000E+00M
TNT WT= 2.0000E+01LBS
HEIGHT= 0. M
CONDITION NO. = 1
PROBLEM = 33.1201
TIME(SEC)
AFWL 1985 MODEL CALCULATIONS
PROBLEM = 33.1201

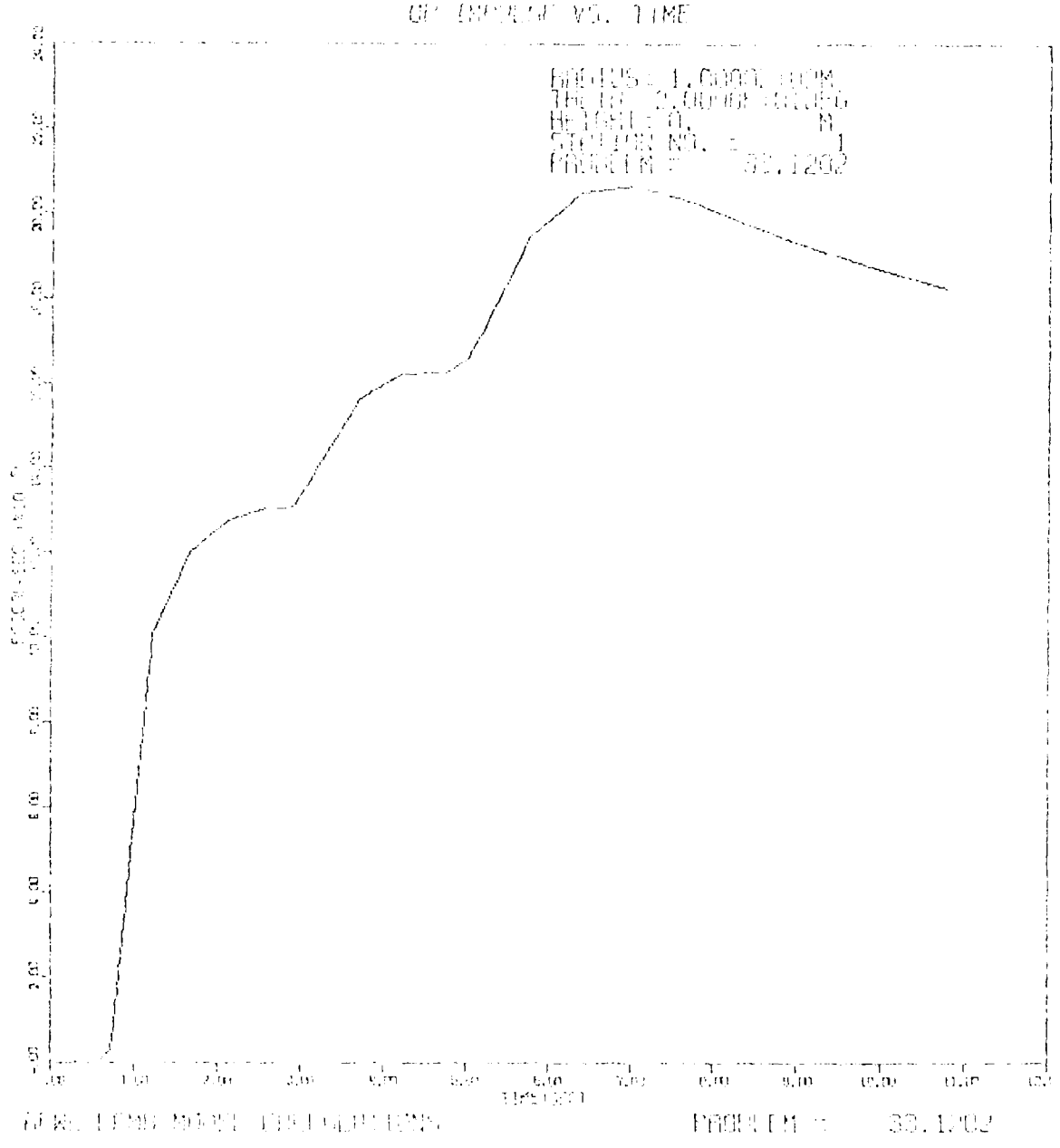
HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



SHOCK			BURST	
PT(S)	VEL(M/S)	DIP(DEG)	NO.	RANGE(M)
0.5499	1031.4	210.7	2	1402.
0.7288	923.3	86.5	10	1537.
0.7695	918.4	332.8	6	1566.
2.8643	527.8	148.5	12	2937.
2.9269	524.4	271.8	4	2967.
3.1771	510.9	29.7	8	3099.
4.7496	456.5	190.7	1	3870.
4.7749	455.9	229.8	3	3881.
4.9718	451.5	107.7	11	3971.
5.0470	449.9	312.2	5	4005.
5.1073	448.7	69.8	9	4032.
5.1571	447.7	349.9	7	4055.

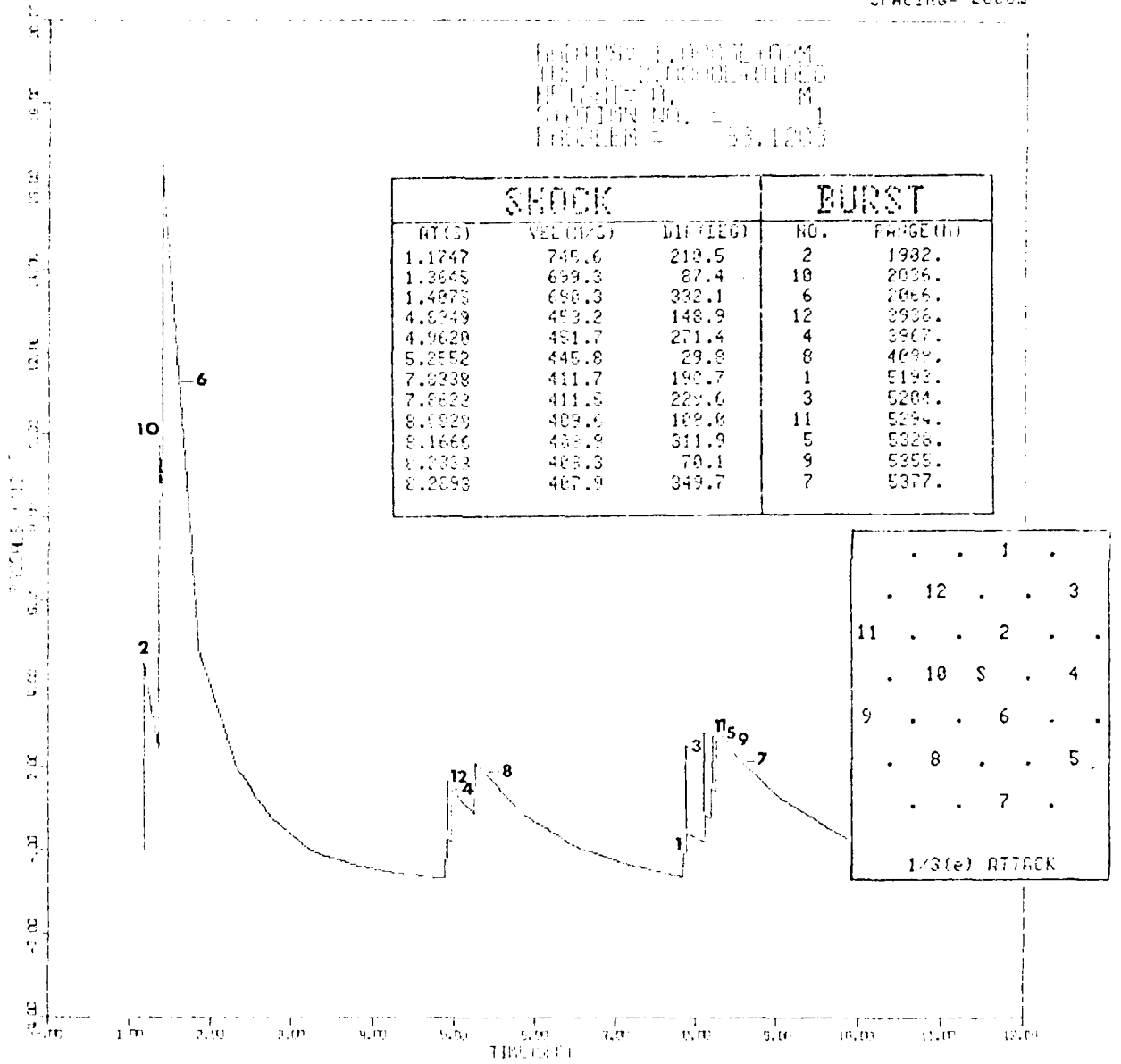
AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.1202


VS. TIME

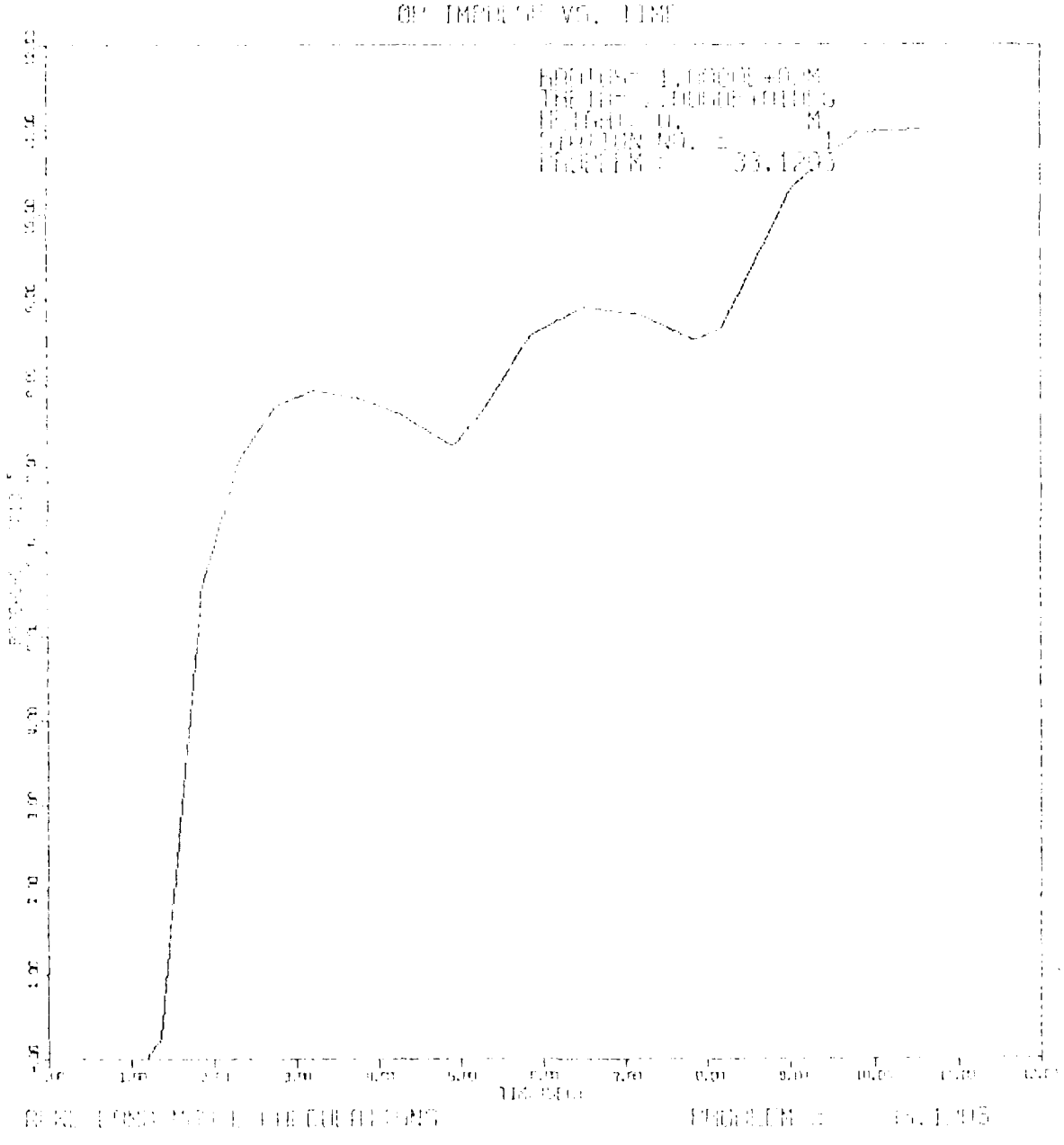
HOB= 0m
YIELD= 5Mt
SPACING= 2000m

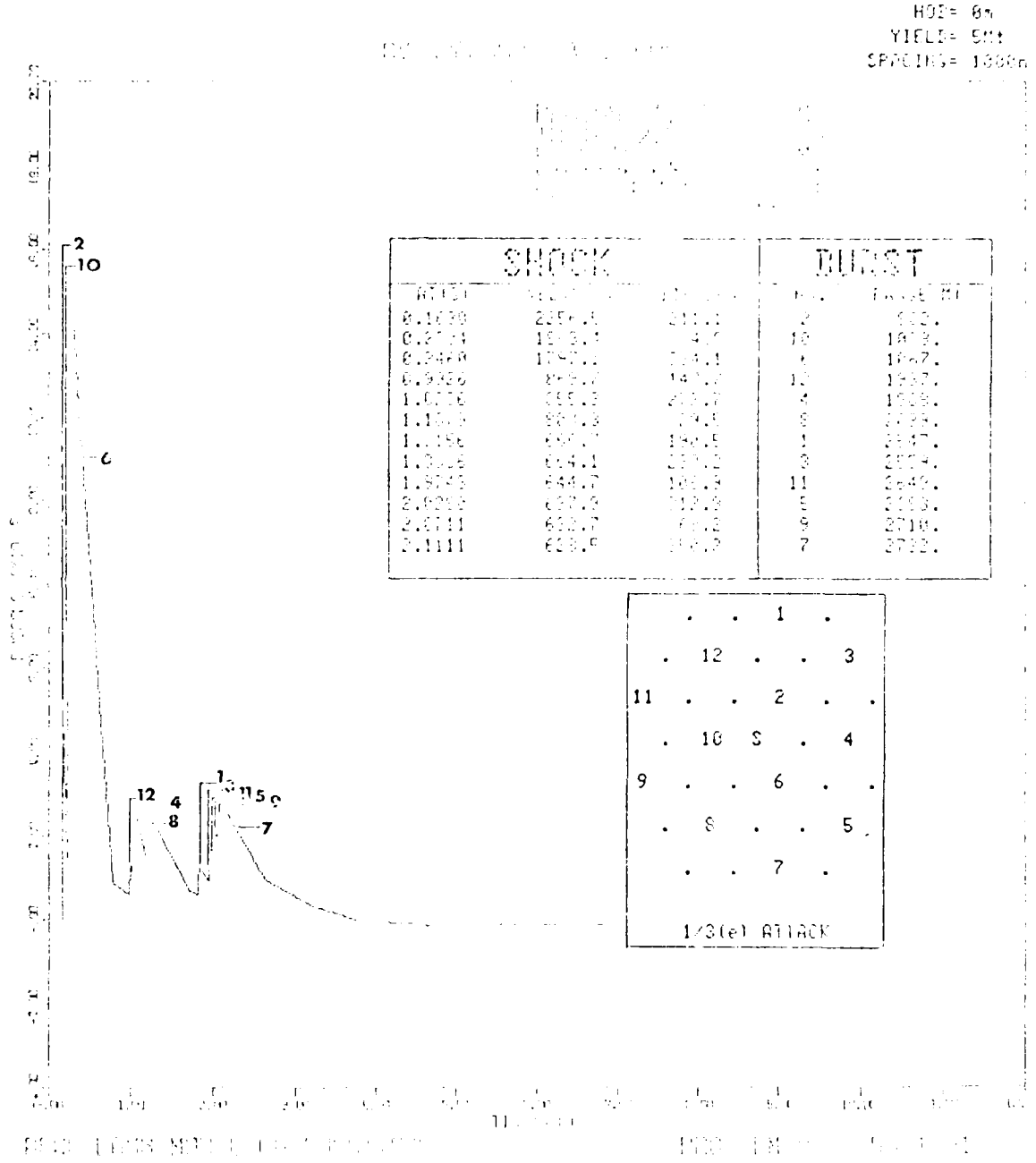
OVERPRESSURE Vs. TIME

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
1.1747	745.6	218.5	2	1982.
1.3645	699.3	87.4	10	2036.
1.4073	690.3	332.1	6	2066.
4.8349	453.2	148.9	12	3936.
4.9620	451.7	271.4	4	3967.
5.2552	445.8	29.8	8	4039.
7.8338	411.7	190.7	1	5193.
7.8622	411.5	229.6	3	5204.
8.0929	409.6	169.8	11	5294.
8.1666	408.9	311.9	5	5328.
8.2303	408.3	70.1	9	5355.
8.2893	407.9	349.7	7	5377.

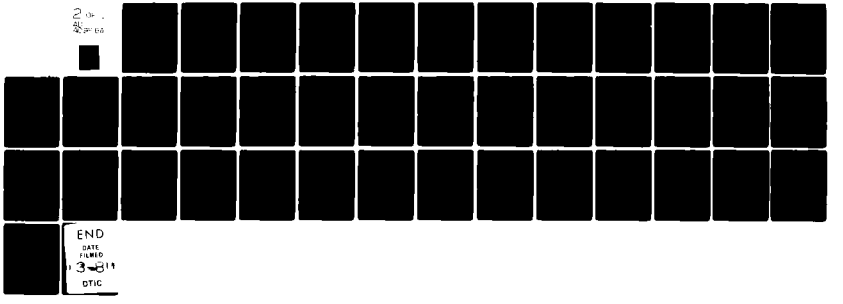


REAL LAMS MODEL CALCULATIONS PROBLEM # 33.1203

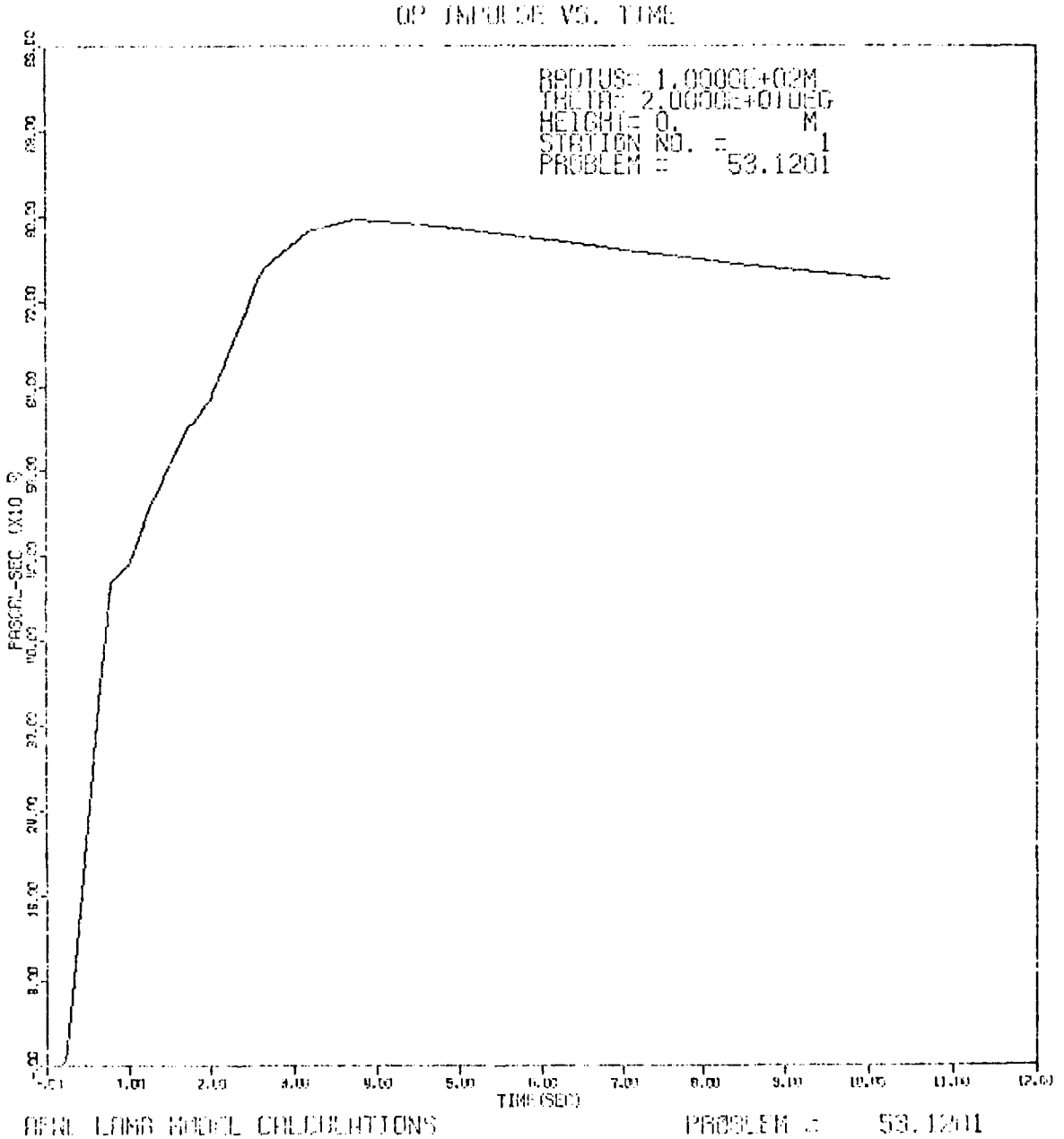



HOB= 0m
YIELD= 5Mt
SPACING= 1300m
SHOCK
BURST
1/3(e) ATTACK

AD-A095 641 AIR FORCE WEAPONS LAB KIRTLAND AFB NM F/G 18/3
LAMB MULTIBURST CALCULATIONS FOR VARIOUS ATTACK SCENARIOS.(U)
MAY 80 J W AUBREY, H J ABEYTA, W E GIFFORD
UNCLASSIFIED AFWL-TR-79-200 NL



END
DATE FILMED
3-81
DTIC



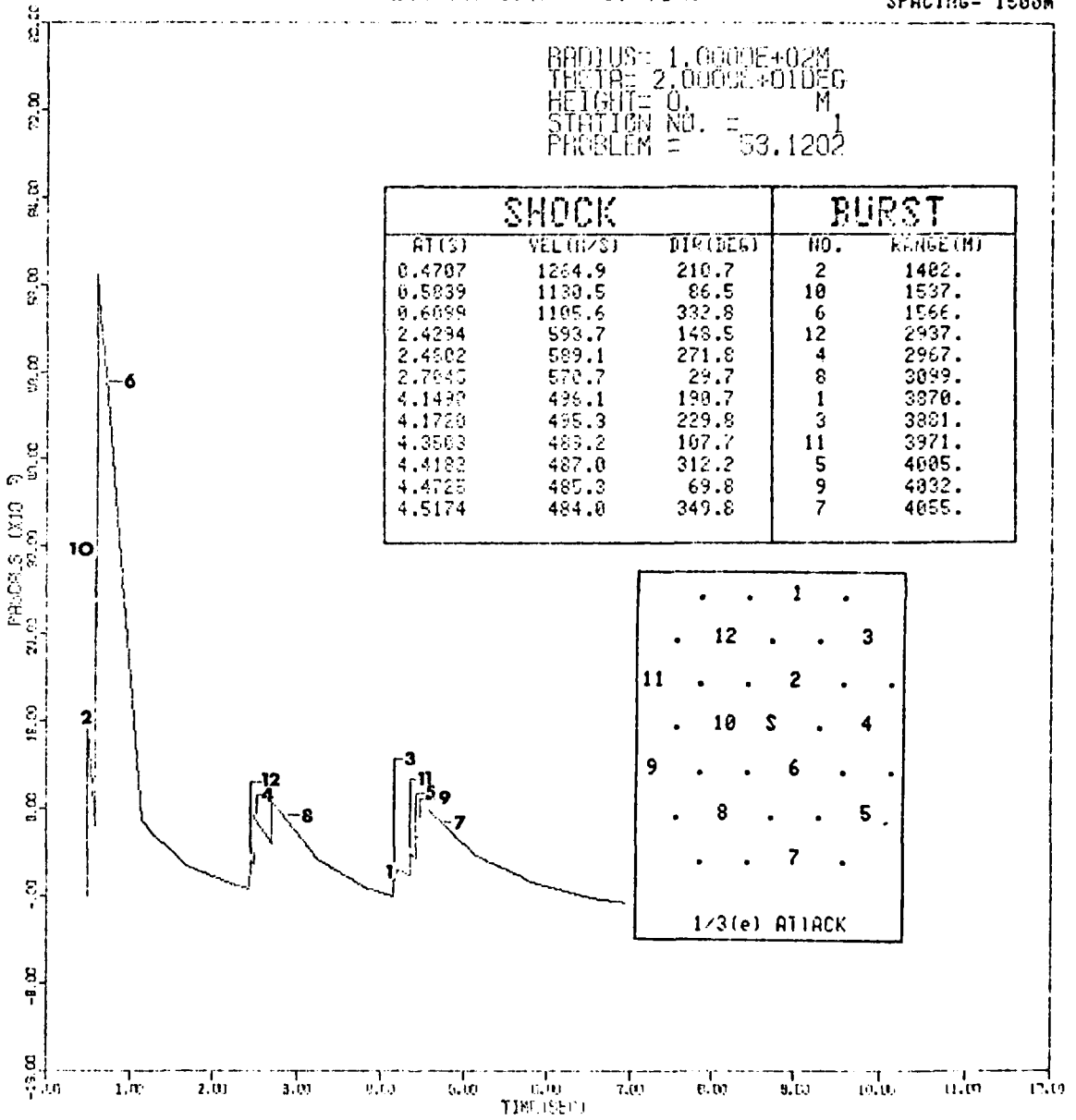
BRL LAMB MODEL CALCULATIONS PROBLEM = 53.1201

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

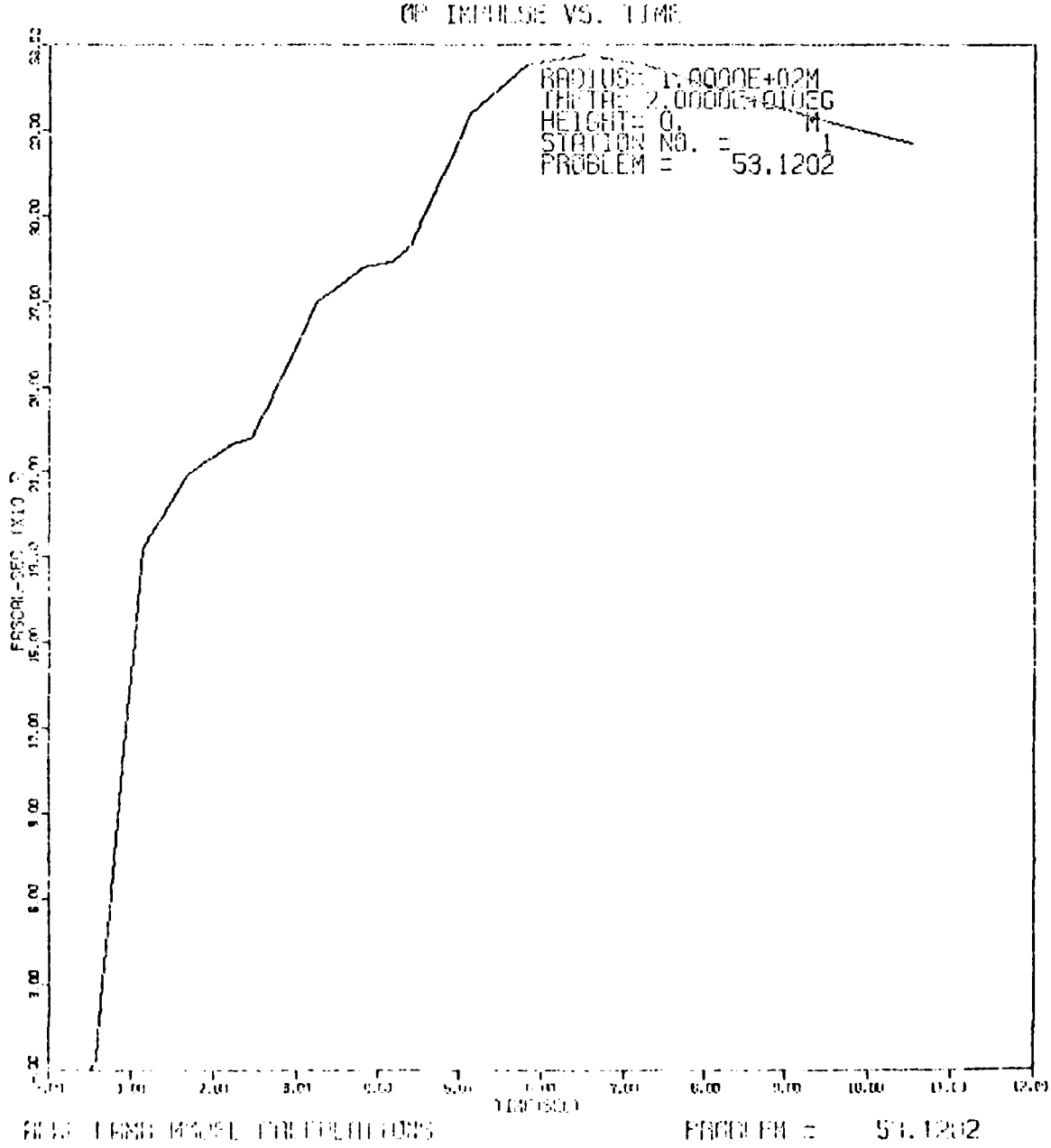
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 2.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1202

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.4707	1264.9	210.7	2	1402.
0.5039	1130.5	86.5	10	1537.
0.6089	1105.6	332.8	6	1566.
2.4294	593.7	148.5	12	2937.
2.4602	589.1	271.8	4	2967.
2.7945	570.7	29.7	8	3099.
4.1439	496.1	190.7	1	3870.
4.1720	495.3	229.8	3	3881.
4.3503	489.2	107.7	11	3971.
4.4182	487.0	312.2	5	4005.
4.4725	485.3	69.8	9	4032.
4.5174	484.0	349.8	7	4055.



BRL LAMB MODEL CALCULATIONS PROBLEM = 53.1202

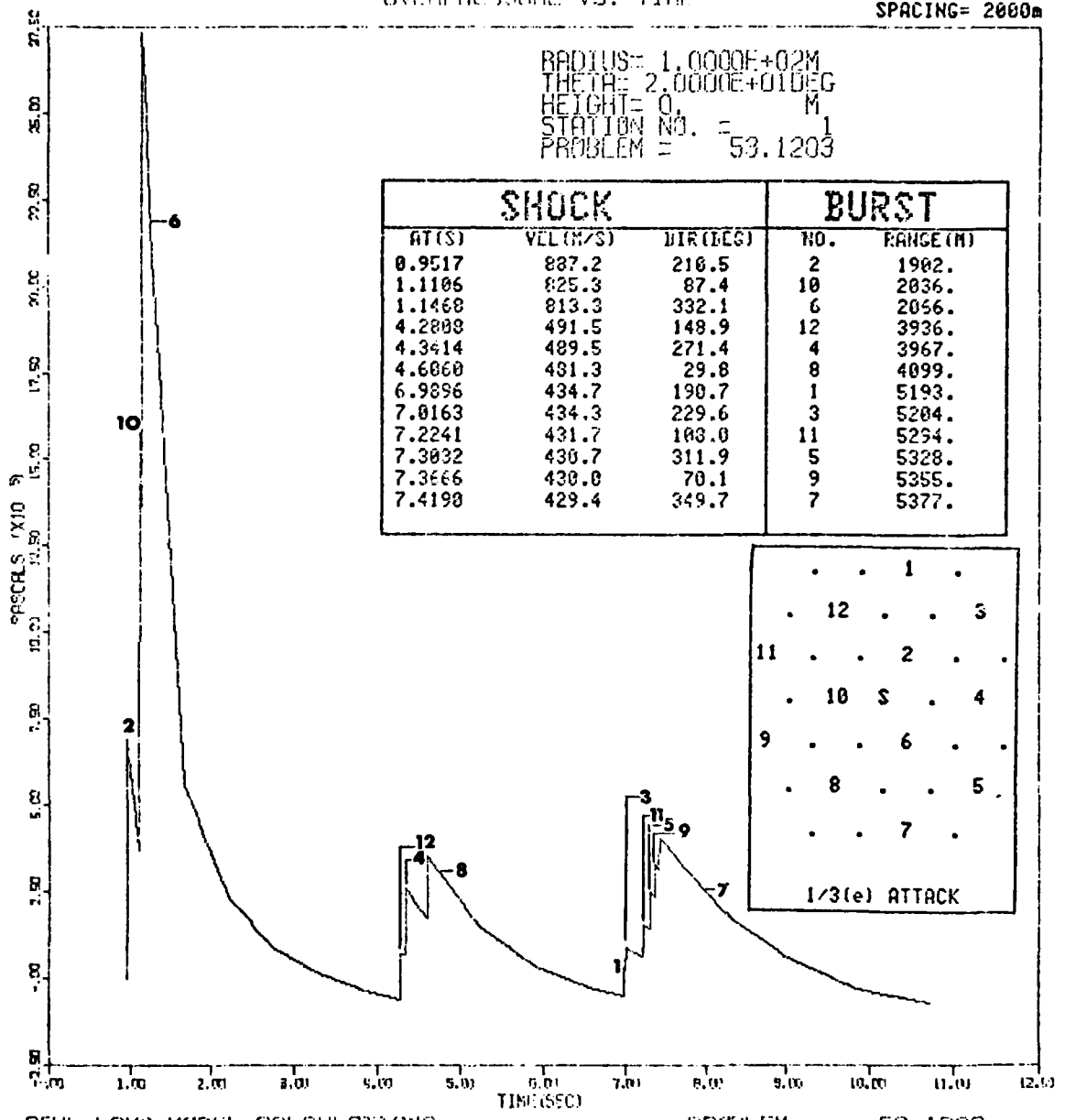

OF IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1202
PRESSURE-SEC (X10 P
TIME(SEC)
PROBLEM = 53.1202

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

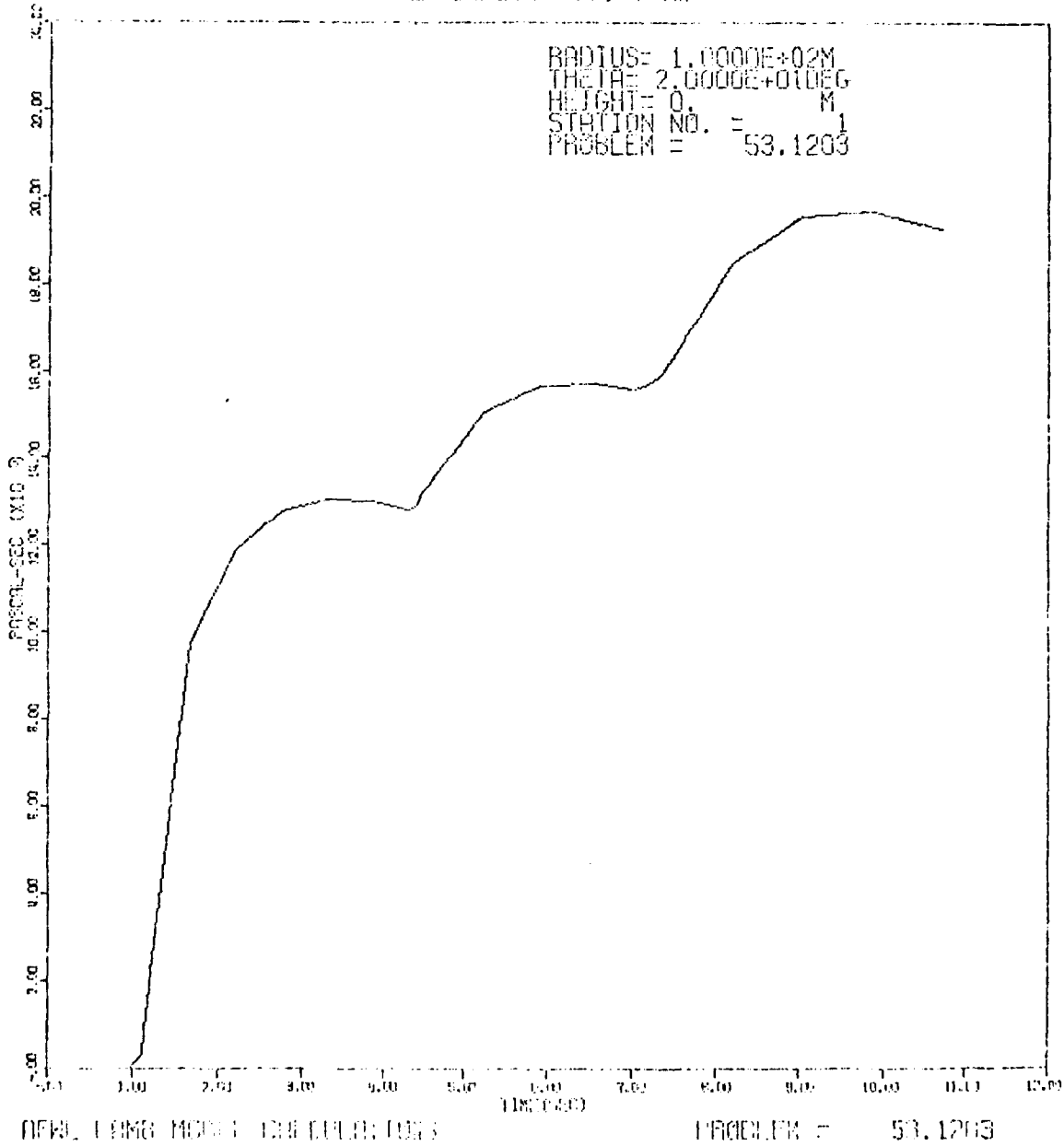
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 2.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1203

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.9517	887.2	216.5	2	1902.
1.1106	825.3	87.4	10	2036.
1.1468	813.3	332.1	6	2056.
4.2808	491.5	148.9	12	3936.
4.3414	489.5	271.4	4	3967.
4.6060	481.3	29.8	8	4099.
6.9896	434.7	190.7	1	5193.
7.0163	434.3	229.6	3	5204.
7.2241	431.7	108.0	11	5294.
7.3032	430.7	311.9	5	5328.
7.3666	430.0	70.1	9	5355.
7.4198	429.4	349.7	7	5377.

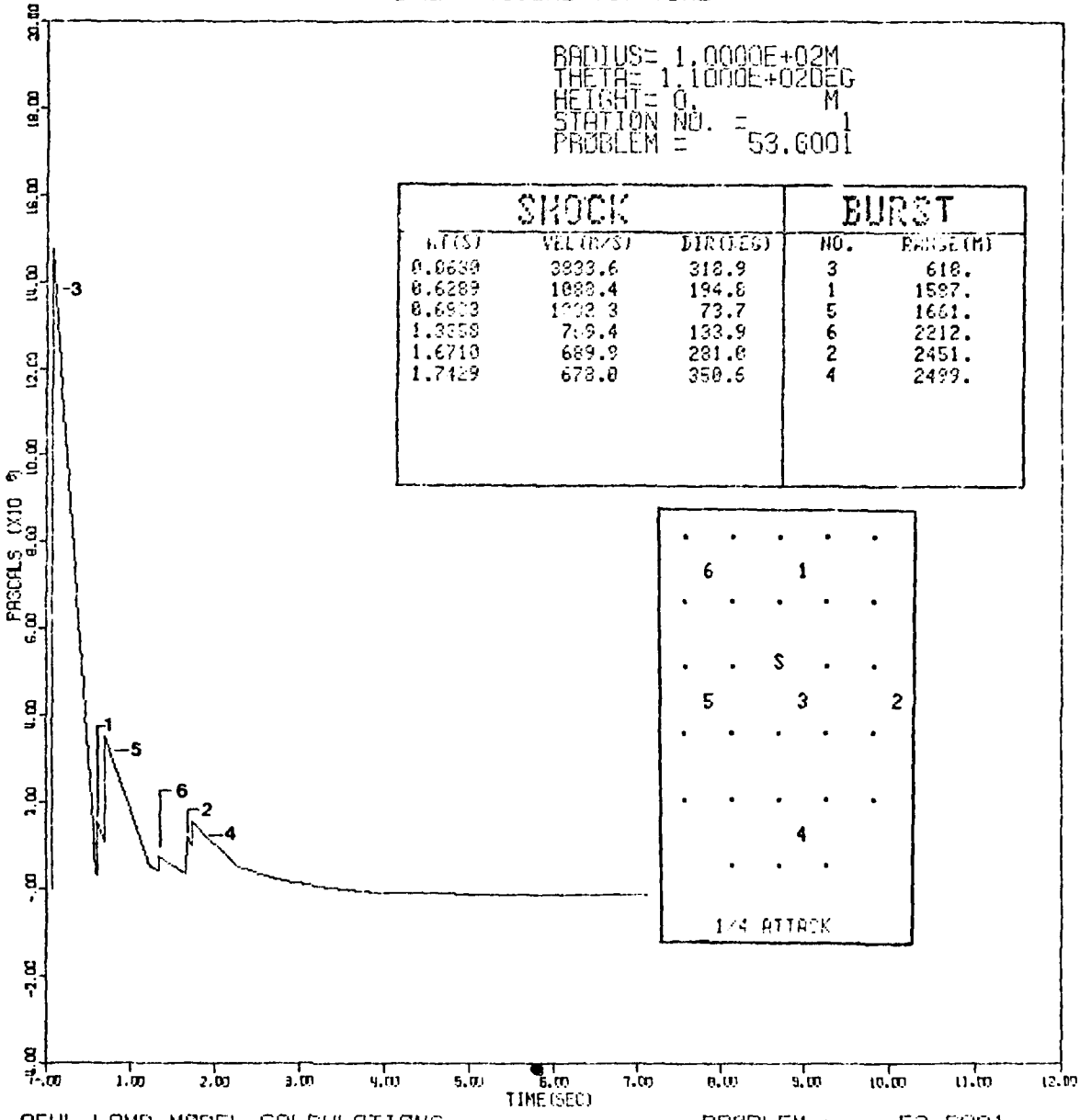


AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.1203

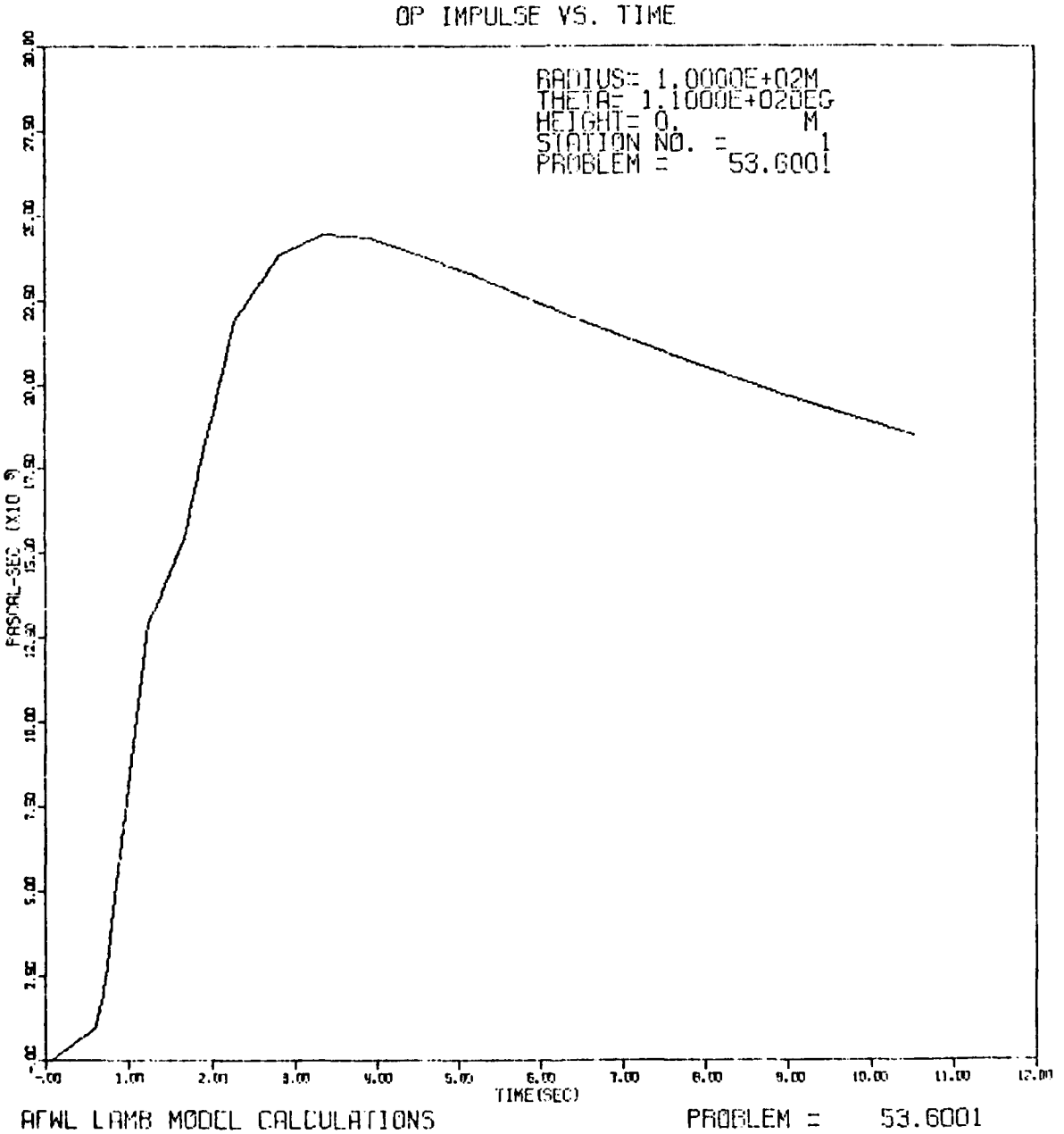

G² IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.0000E+01DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.1203
PASCAL-SEC (X10 2)
TIME(SEC)
PROBLEM = 53.1203

HOB= 0M
YIELD= 5Mt
SPACING= 1600m

OVERPRESSURE VS. TIME

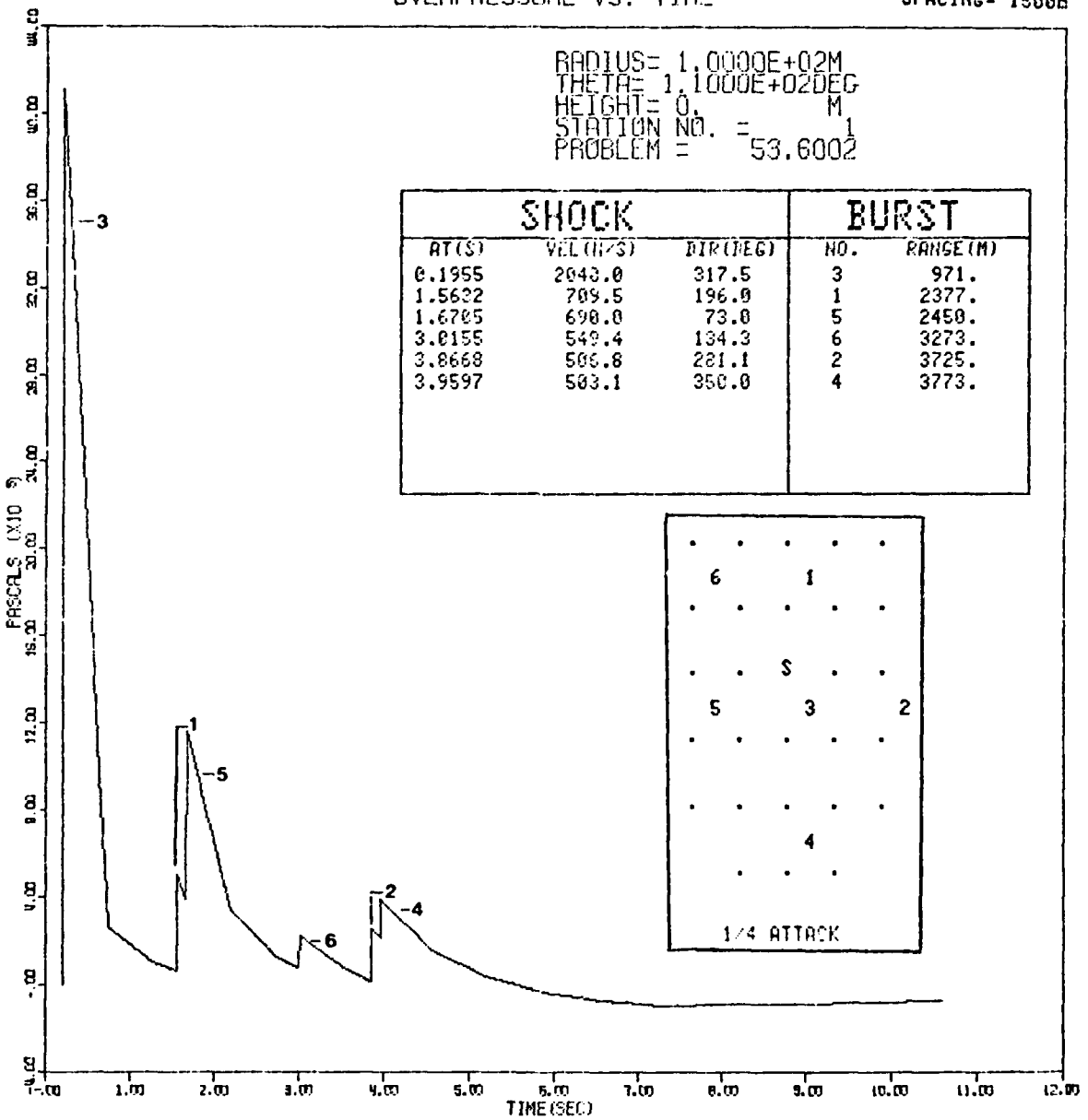


AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6001


OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.6001
PASCAL-SEC (X10)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 53.6001

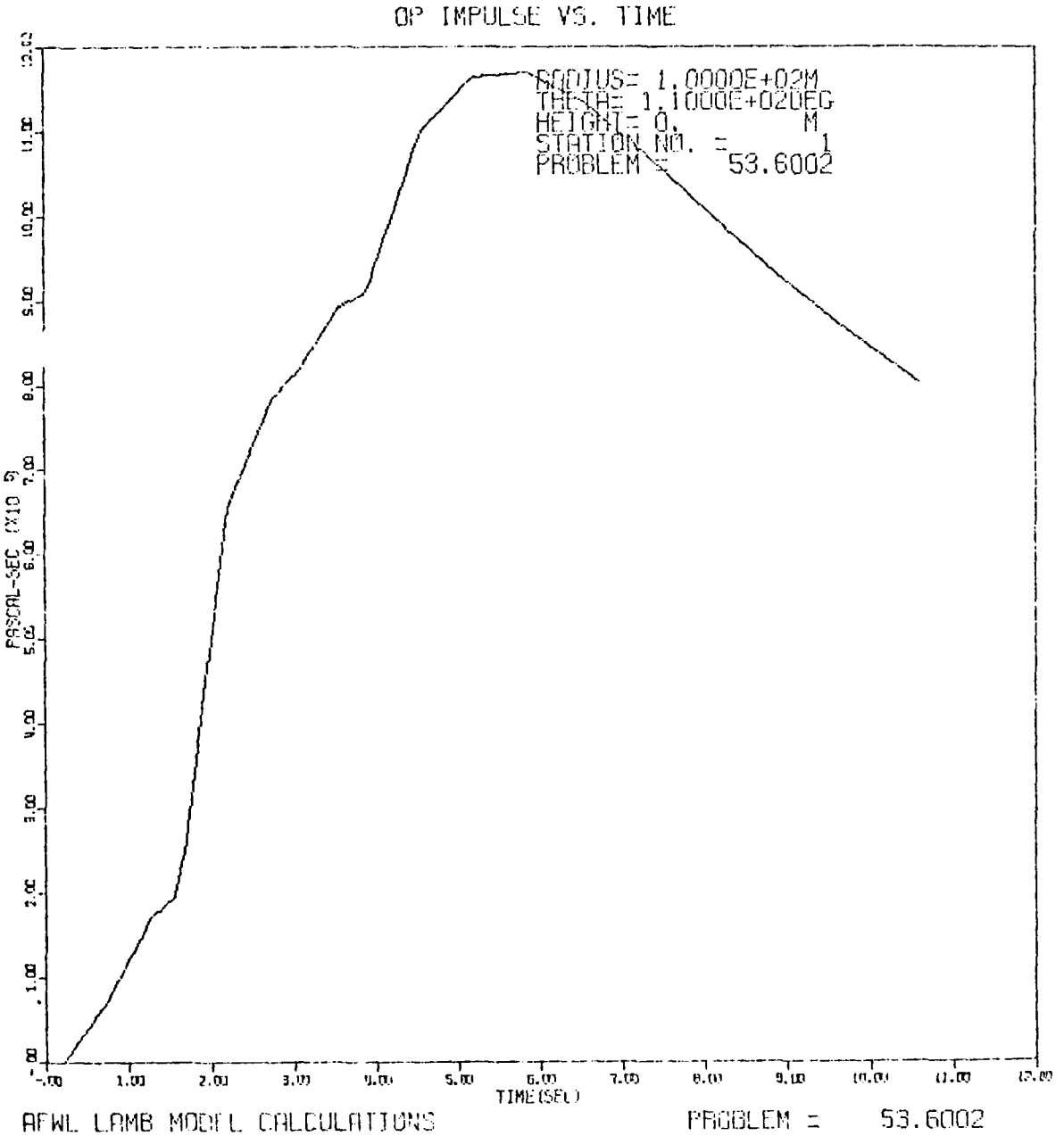
HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



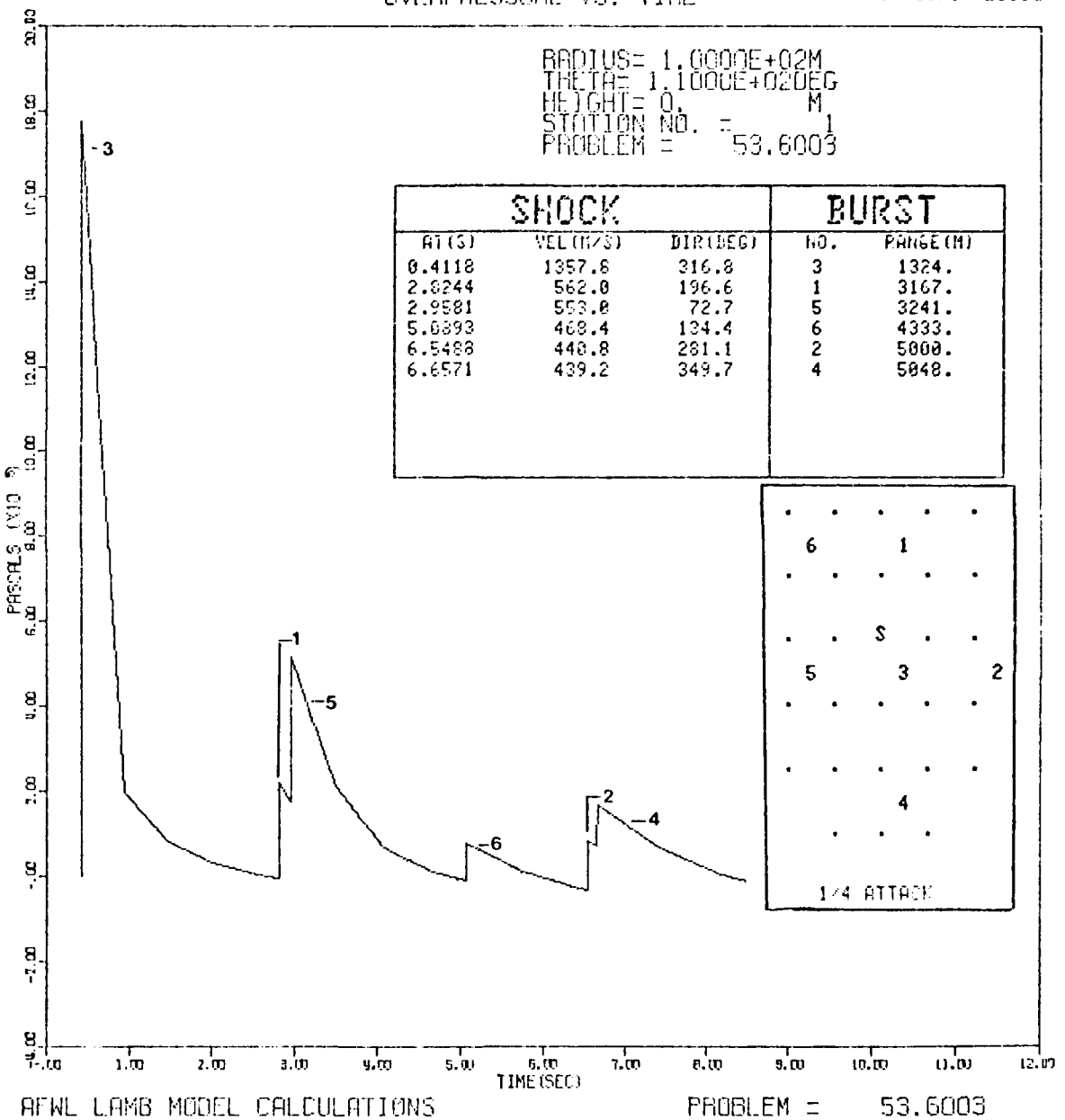
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.1955	2040.0	317.5	3	971.
1.5632	709.5	196.9	1	2377.
1.6705	698.0	73.8	5	2458.
3.0155	549.4	134.3	6	3273.
3.8668	506.8	281.1	2	3725.
3.9597	503.1	350.0	4	3773.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6002


OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.6002
PASCAL-SEC (X10 5)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 53.6002

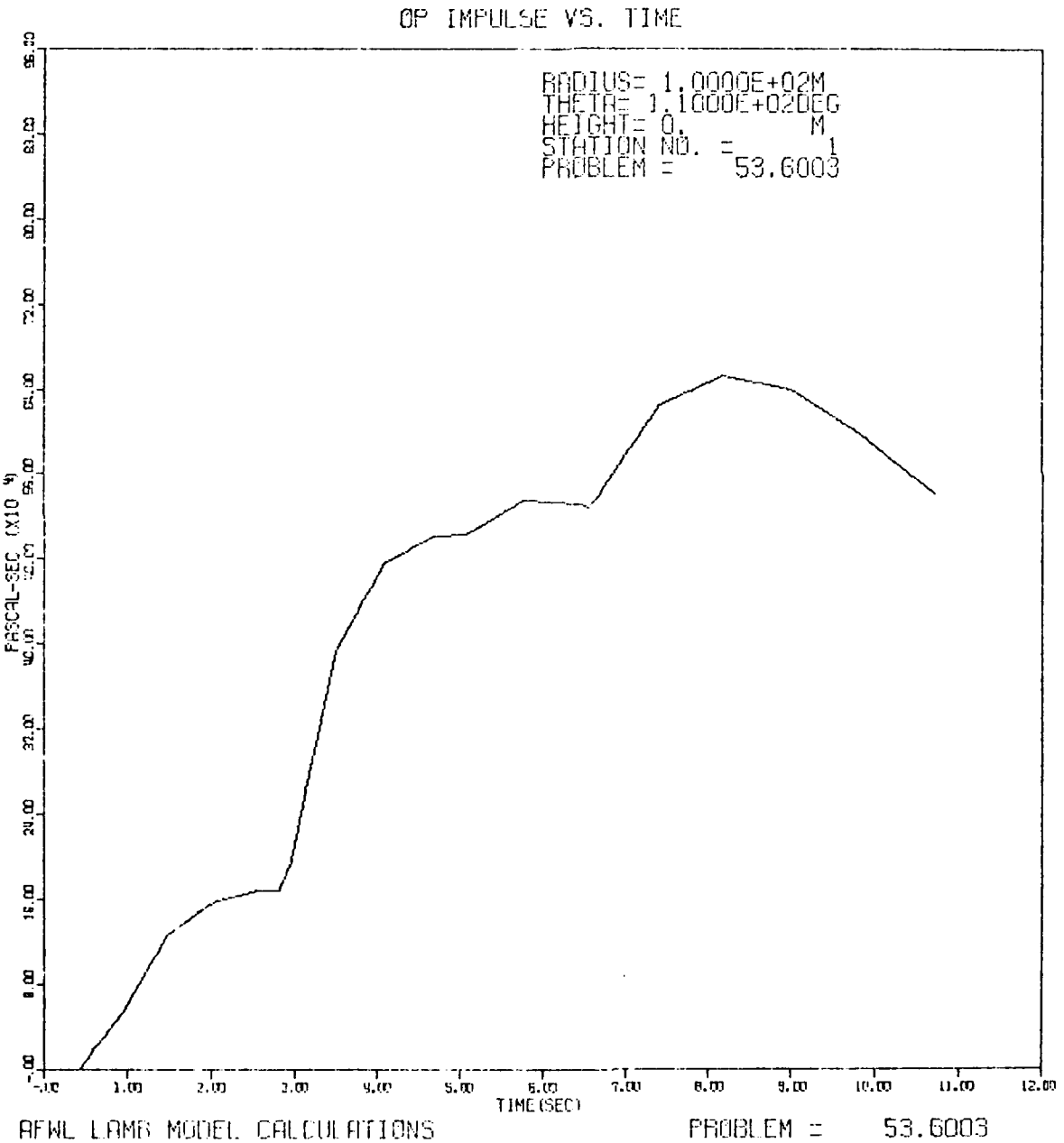
HOB= 0m
YIELD= 5Mt
SPACING= 2000m

OVERPRESSURE VS. TIME



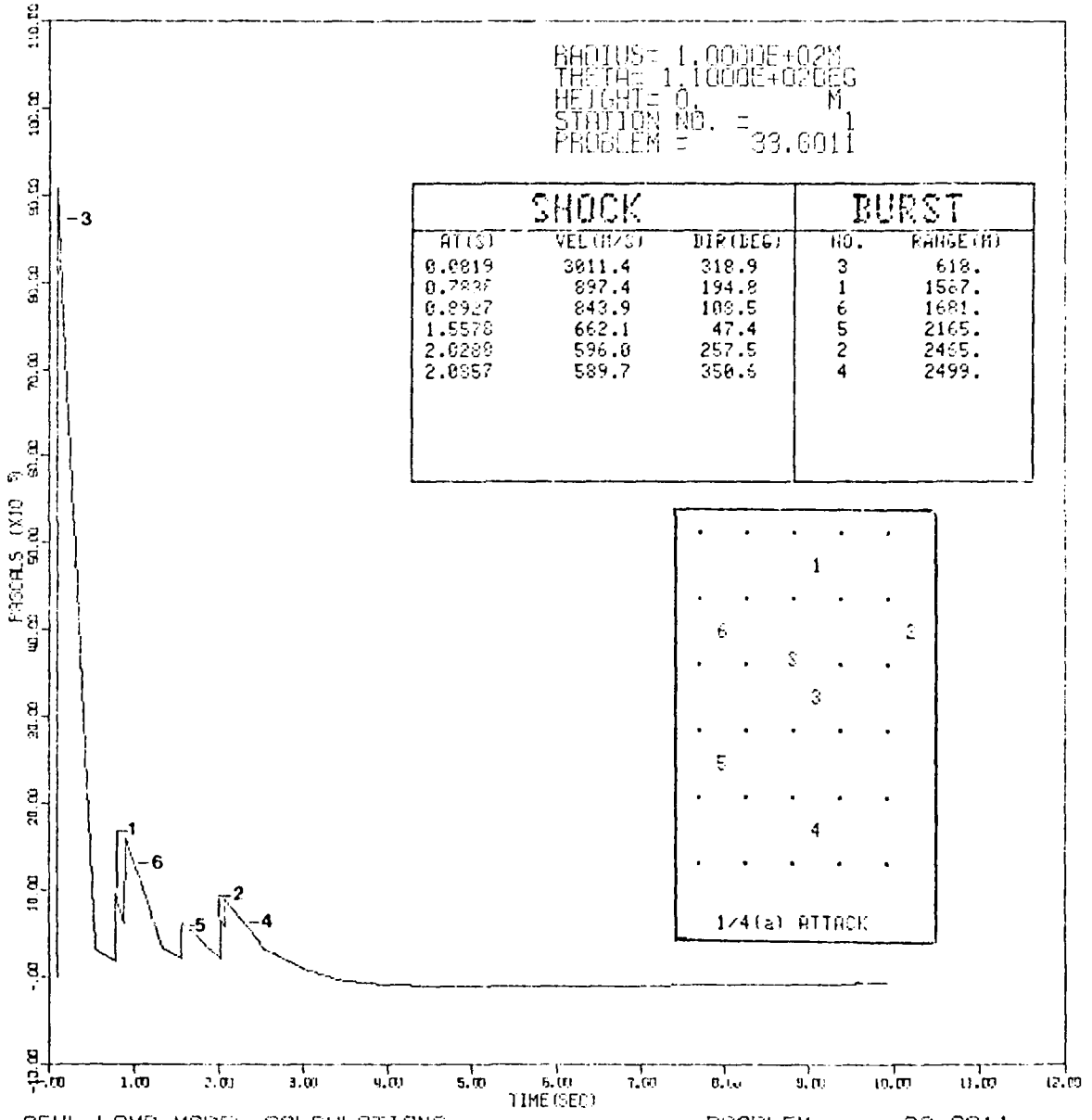
SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.4118	1357.8	316.8	3	1324.
2.8244	562.0	196.6	1	3167.
2.9581	553.0	72.7	5	3241.
5.0393	468.4	134.4	6	4333.
6.5488	448.8	281.1	2	5000.
6.6571	439.2	349.7	4	5048.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6003

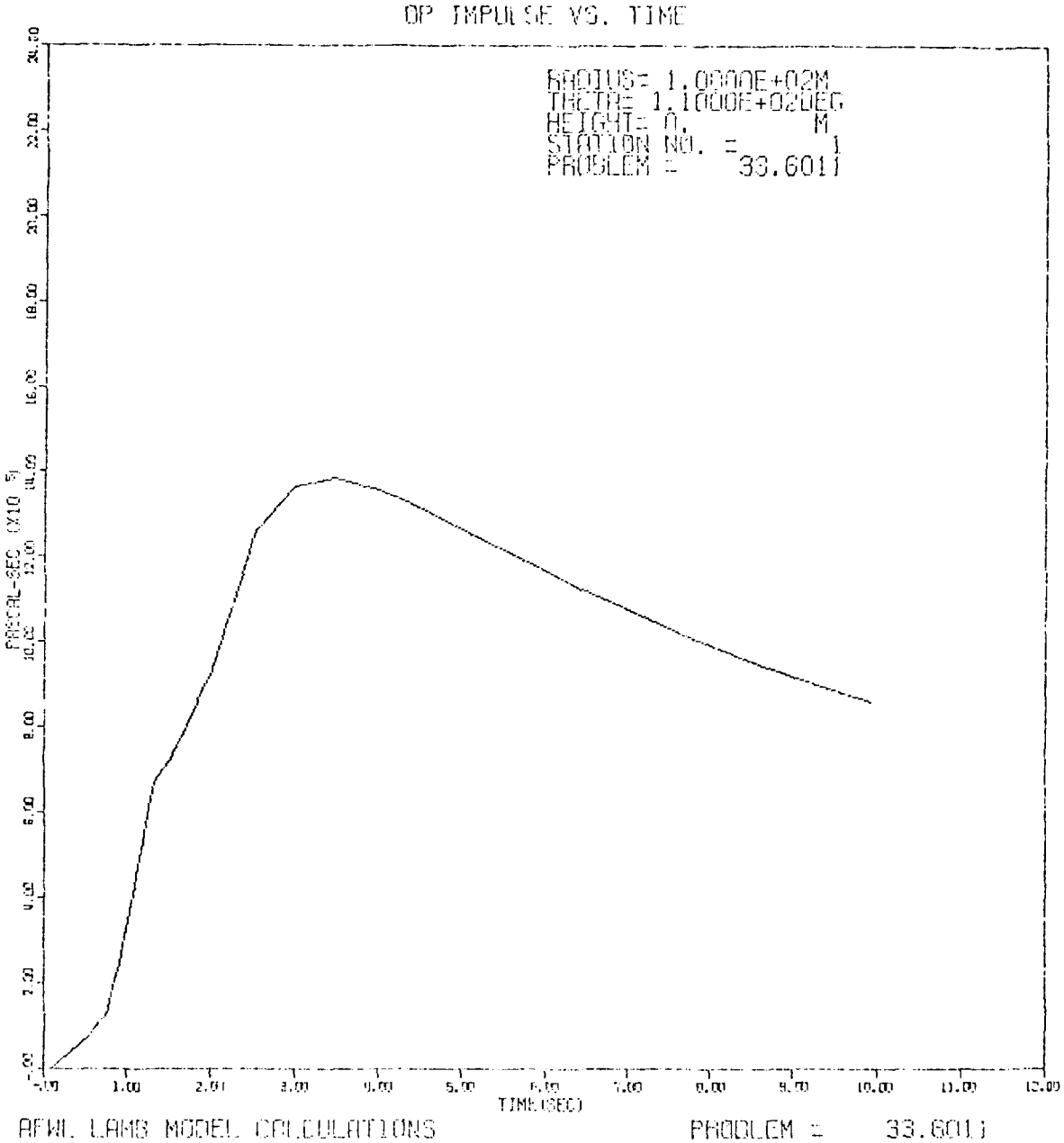

ΔP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.6003
PASCAL-SEC (X10 4)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 53.6003

HOB= 0m
YIELD= 3Mt
SPACING= 1000m

OVERPRESSURE VS. TIME



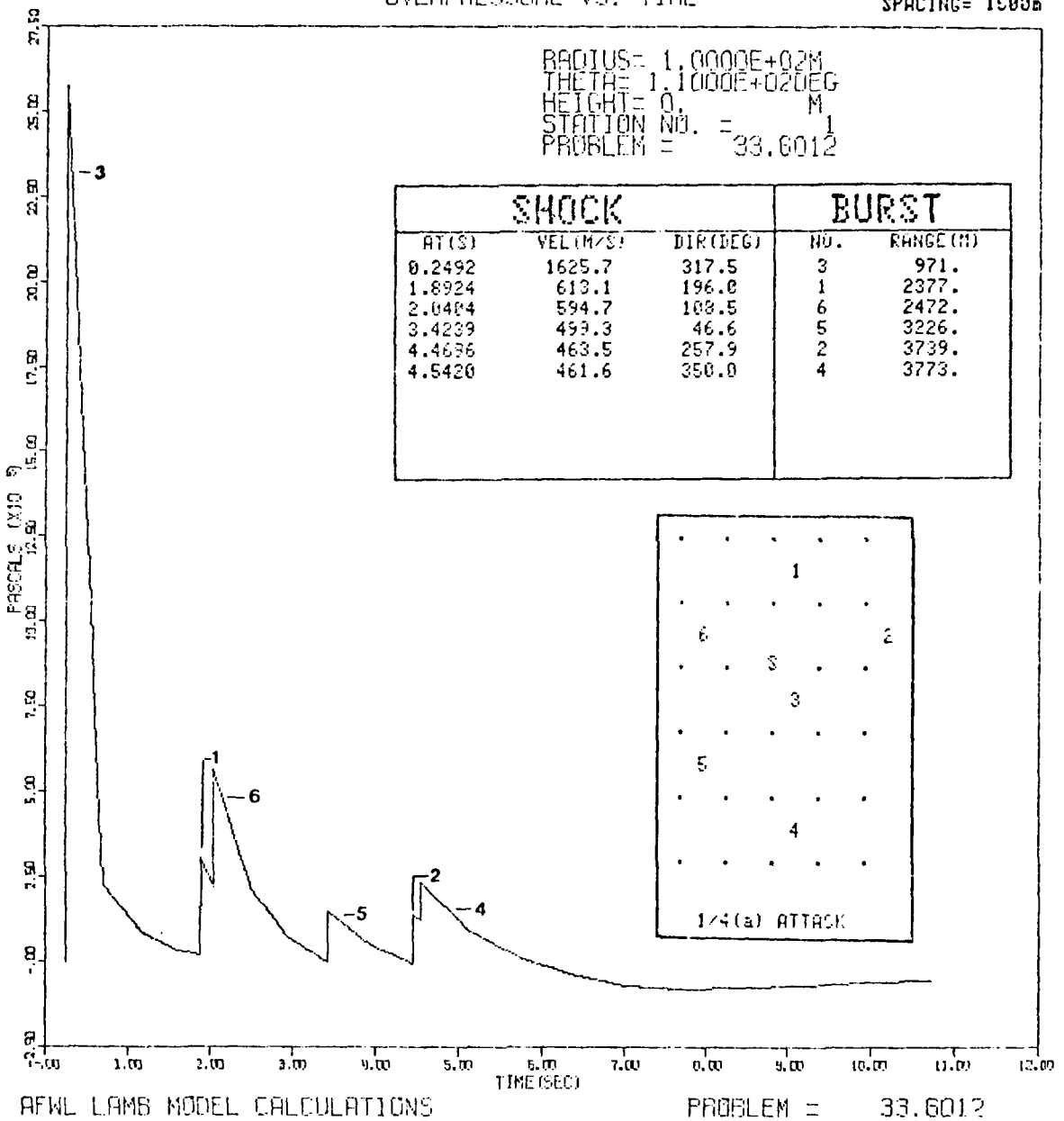
AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6011



AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6011

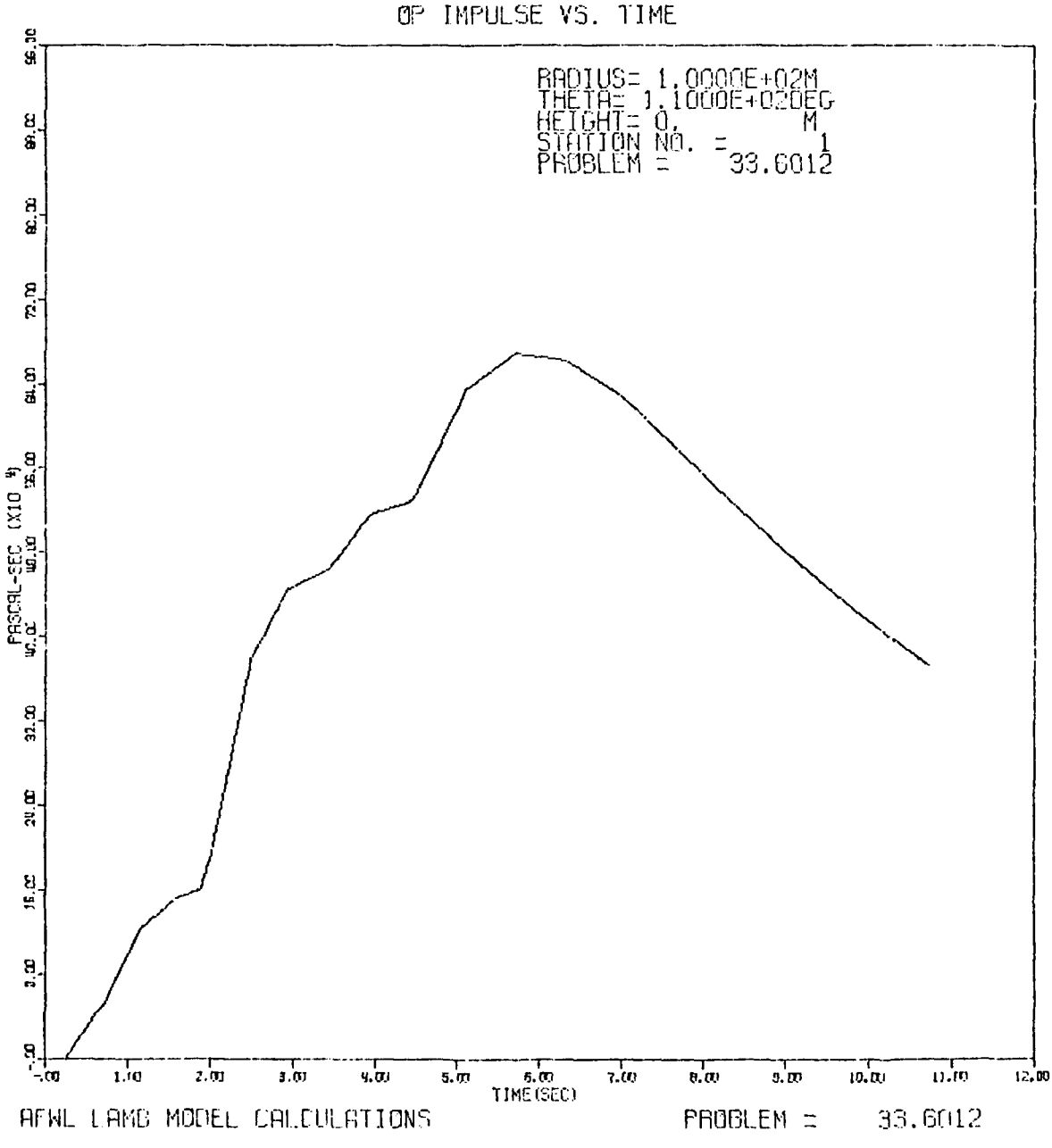
HOB= 0m
YIELD= 3Mt
SPACING= 1500m

OVERPRESSURE VS. TIME



SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.2492	1625.7	317.5	3	971.
1.8924	613.1	196.0	1	2377.
2.0404	594.7	108.5	6	2472.
3.4239	499.3	46.6	5	3226.
4.4696	463.5	257.9	2	3739.
4.5420	461.6	350.0	4	3773.

AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6012

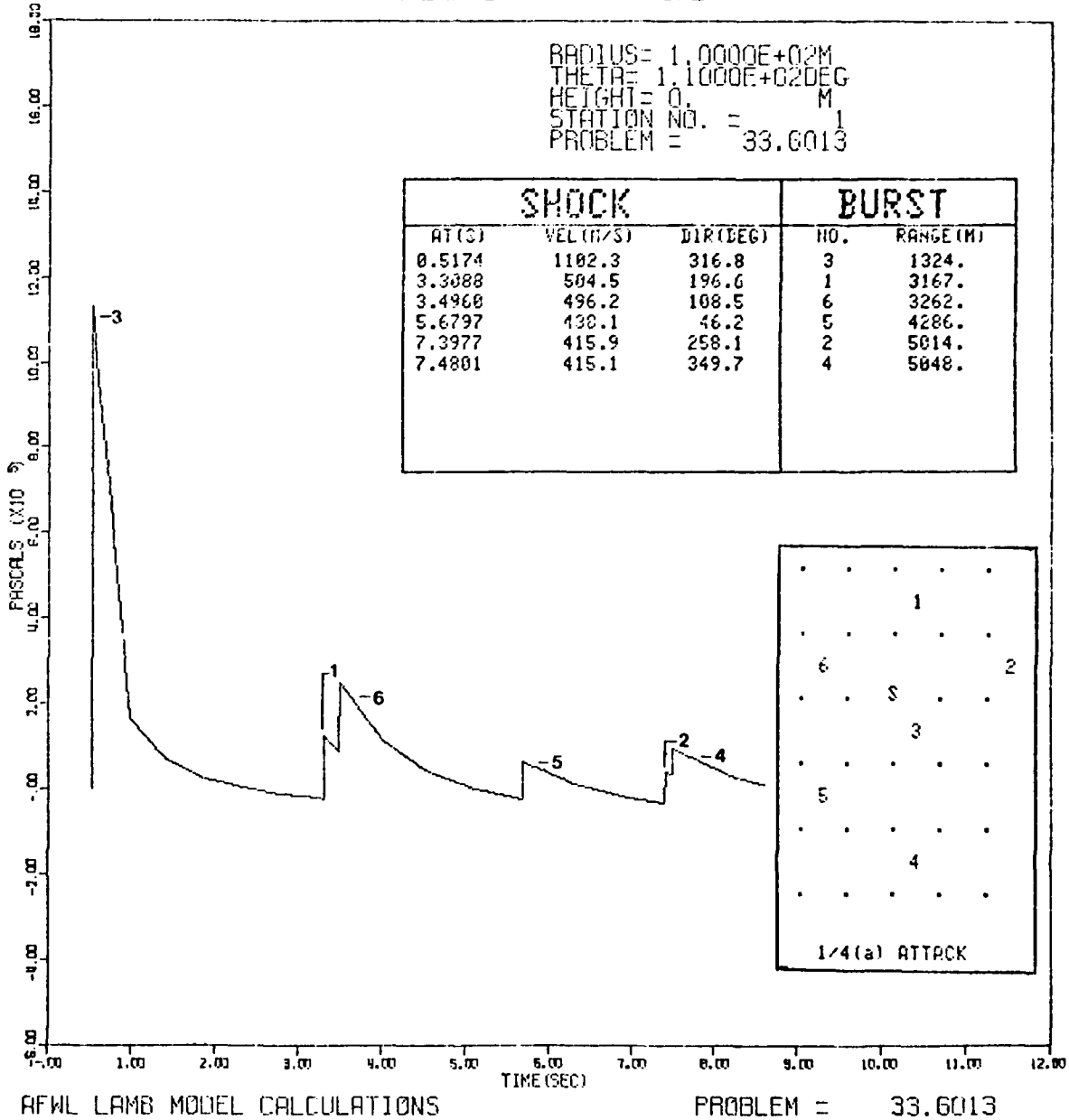

OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.6012
PASCAL-SEC (X10 4)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 33.6012

HOB= 0m
YIELD= 3Mt
SPACING= 2000m

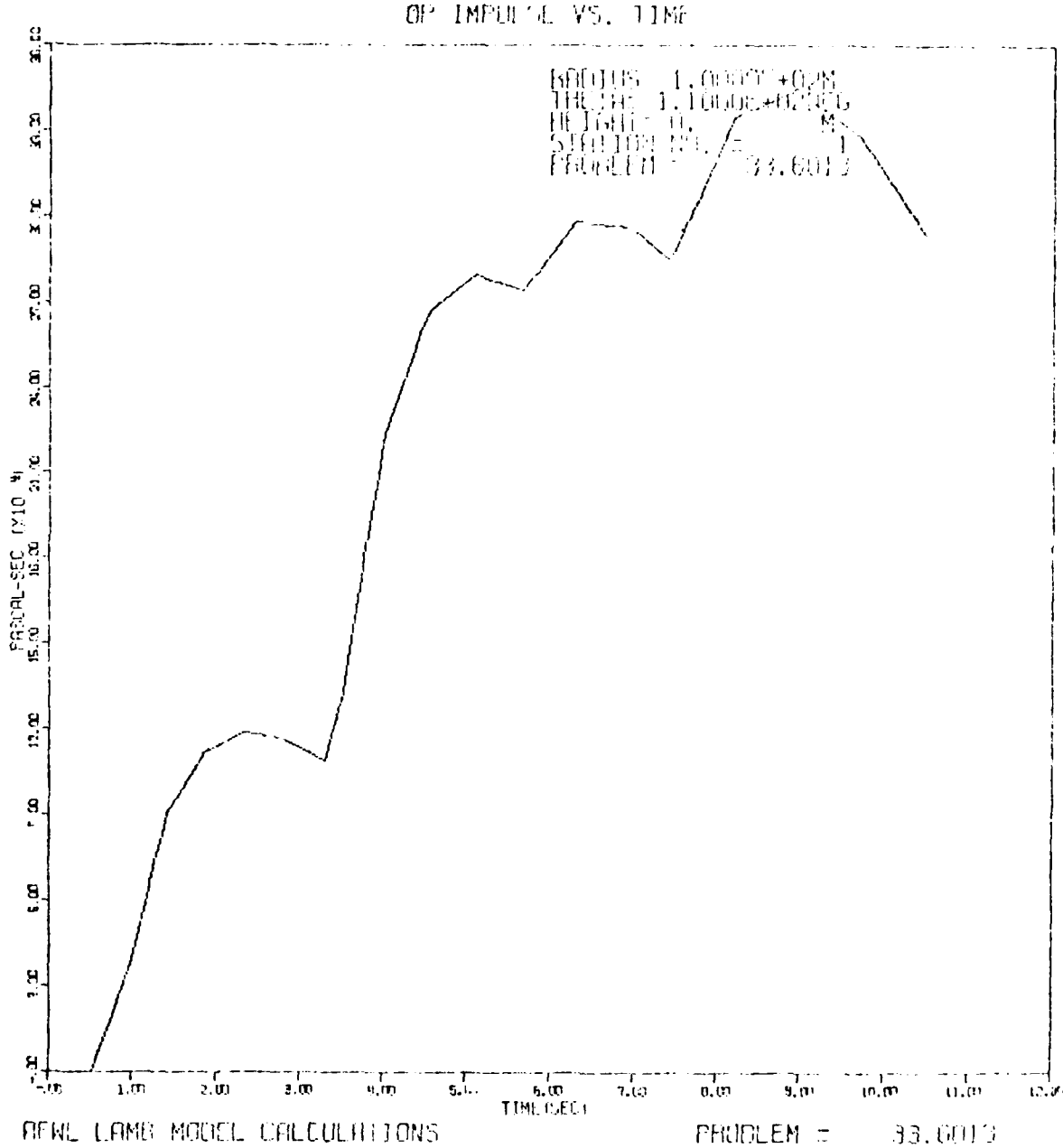
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 33.6013

SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.5174	1102.3	316.8	3	1324.
3.3088	504.5	196.6	1	3167.
3.4960	496.2	108.5	6	3262.
5.6797	430.1	46.2	5	4286.
7.3977	415.9	258.1	2	5014.
7.4801	415.1	349.7	4	5048.



AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.6013



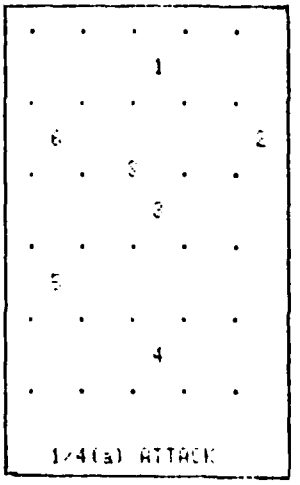
AFWL LAMB MODEL CALCULATIONS PROBLEM = 33.0013

HOB= 0m
YIELD= 5Mt
SPACING= 1000m

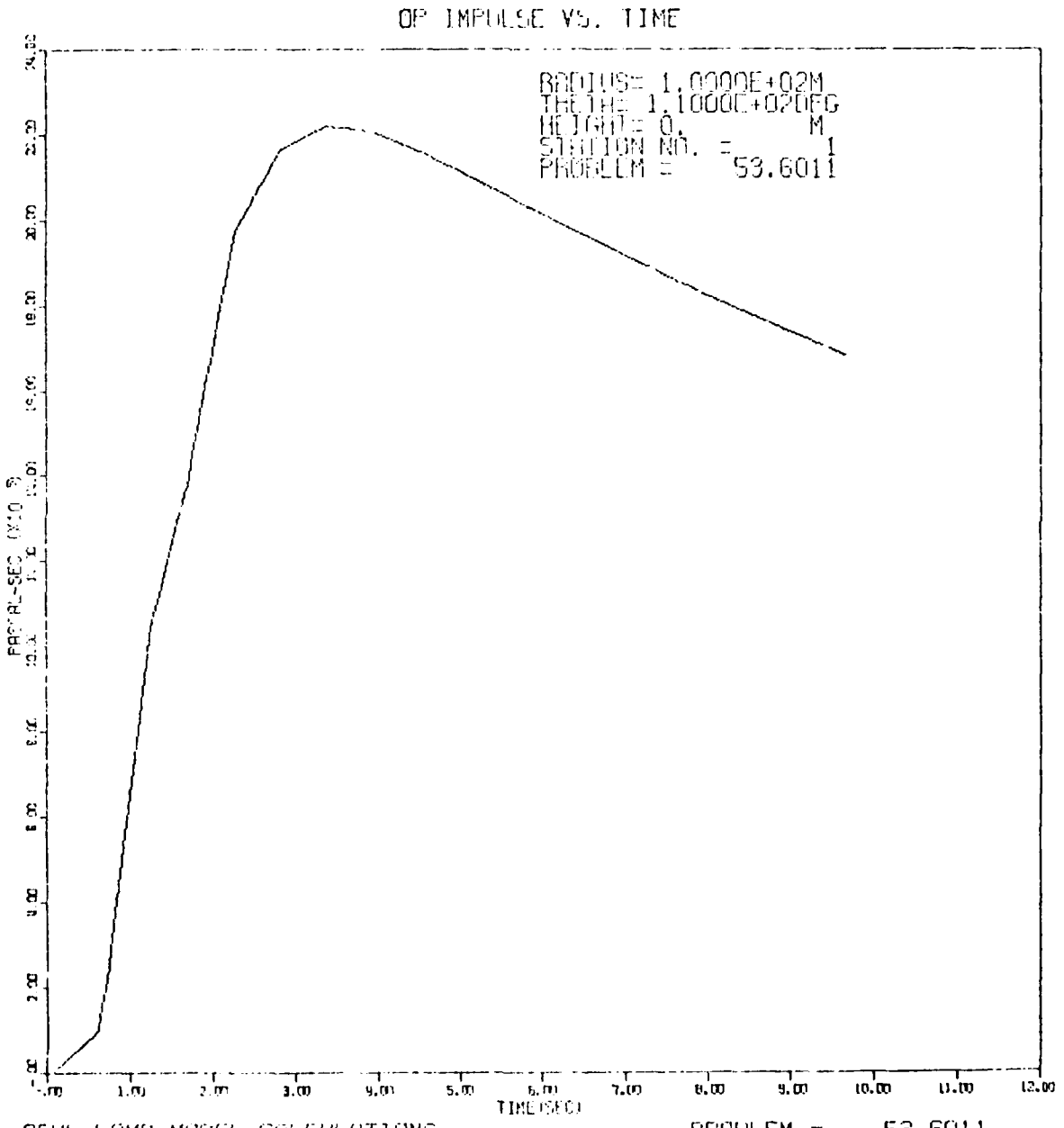
OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 53.0011

SHOCK			BURST	
ARRIV	VELOCITY	DIFTIME	NO.	RANGE(M)
0.6470	3883.5	318.9	3	618.
0.8354	1008.4	194.8	1	1587.
0.9158	1017.9	108.5	6	1681.
1.0734	779.8	47.4	5	2165.
1.1616	686.4	257.5	2	2465.
1.7429	678.0	350.6	4	2499.



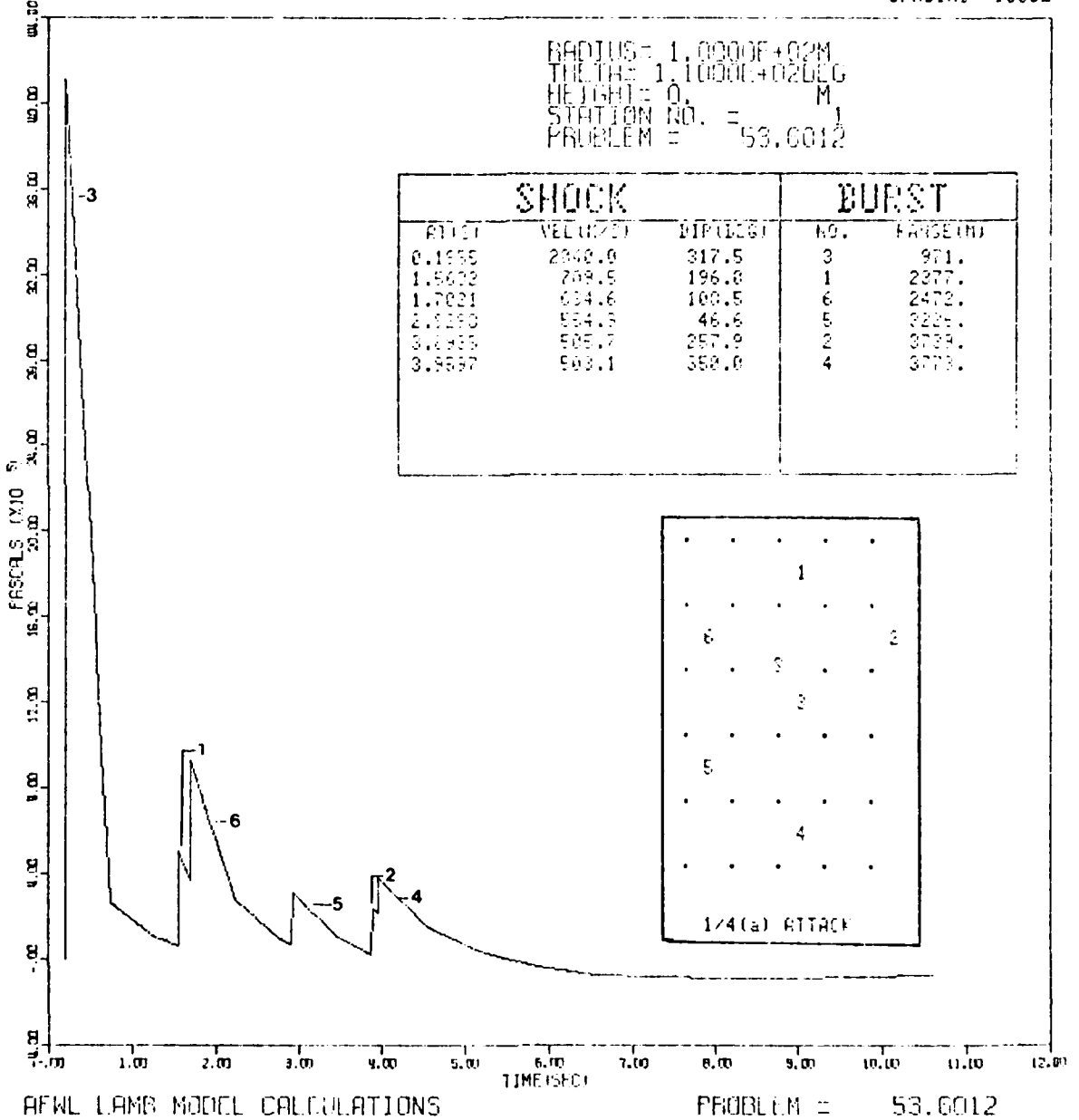
NEWL LOAN MODEL CALCULATIONS PROBLEM = 53.0011



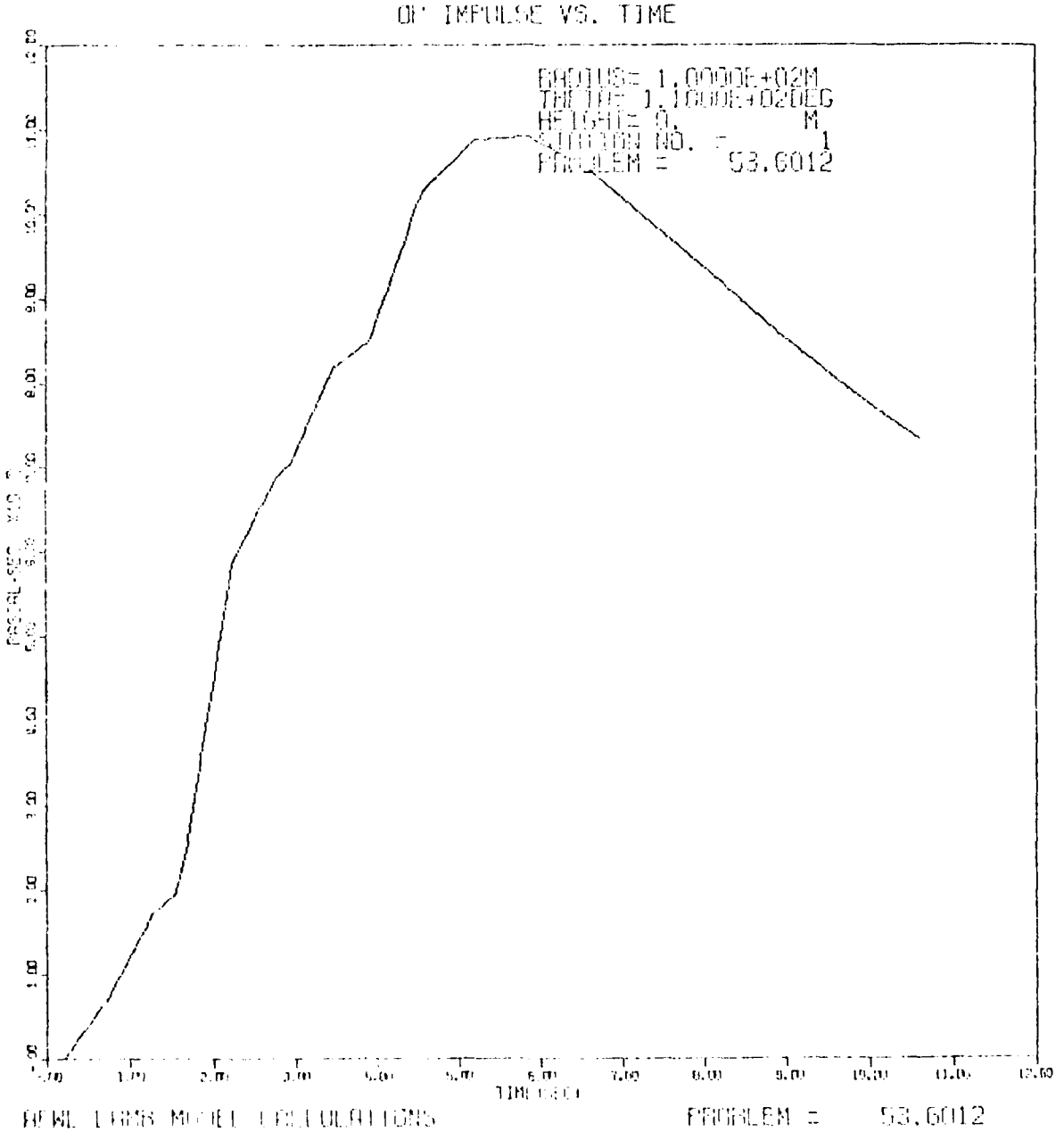
AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6011

HOB= 0m
YIELD= 5Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

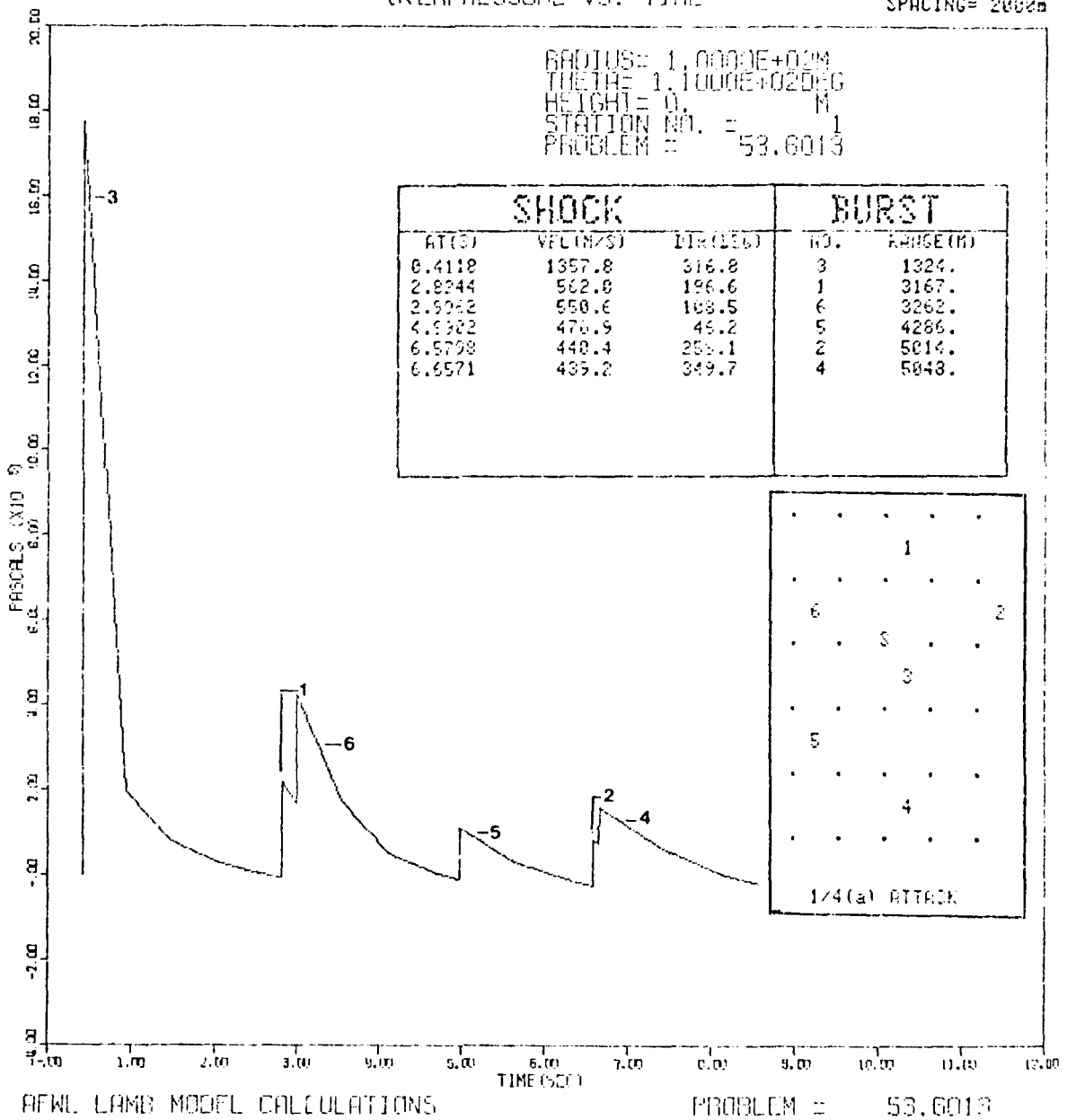


AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.0012

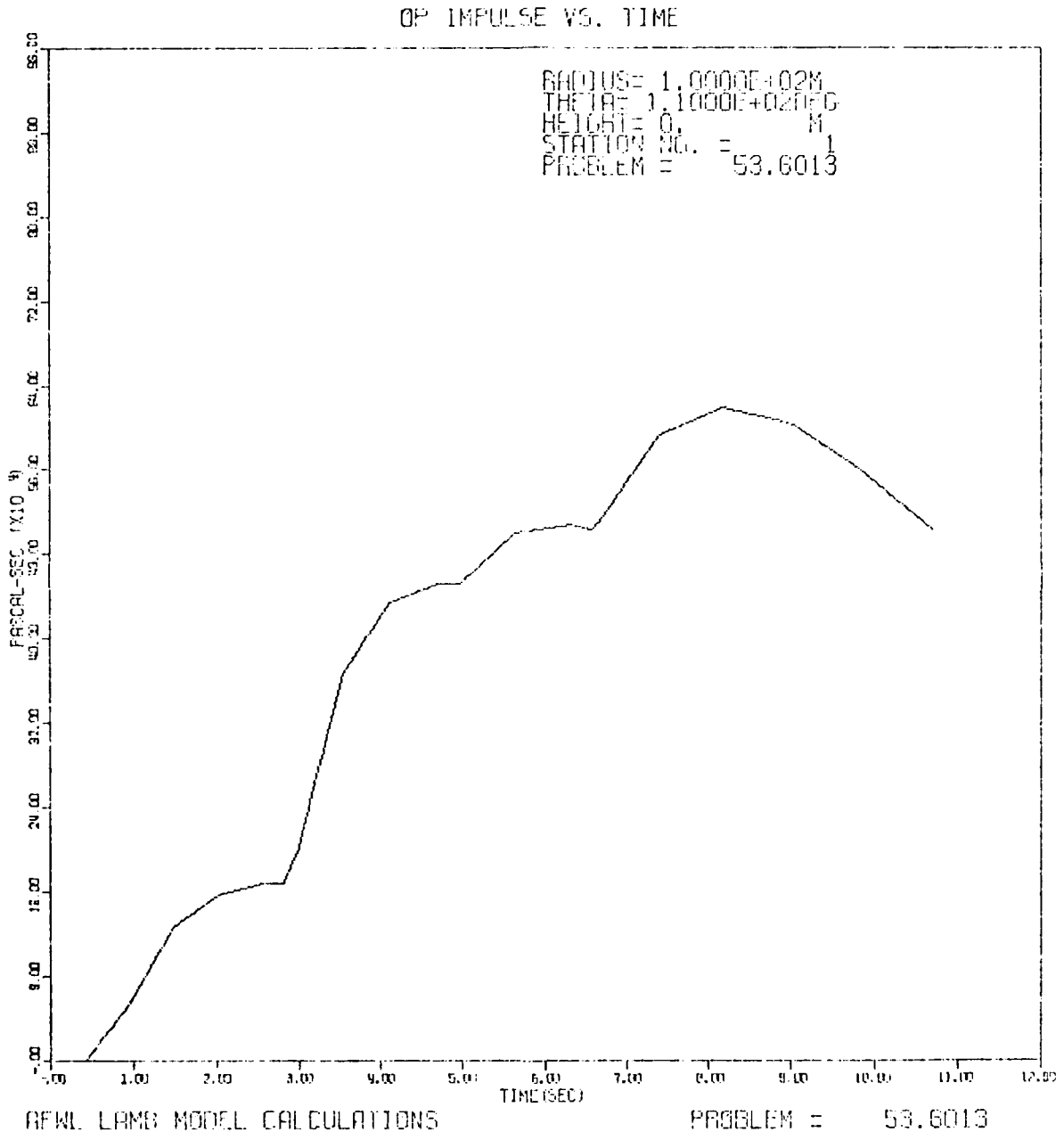

OF IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
SOLUTION NO. = 1
PROBLEM = 53.6012
PASCAL-SEC
TIME (SEC)
BRL 1988 MODEL CALCULATIONS
PROBLEM = 53.6012

HOB= 0m
YIELD= 5Mt
SPACING= 2000m

OVERPRESSURE VS. TIME



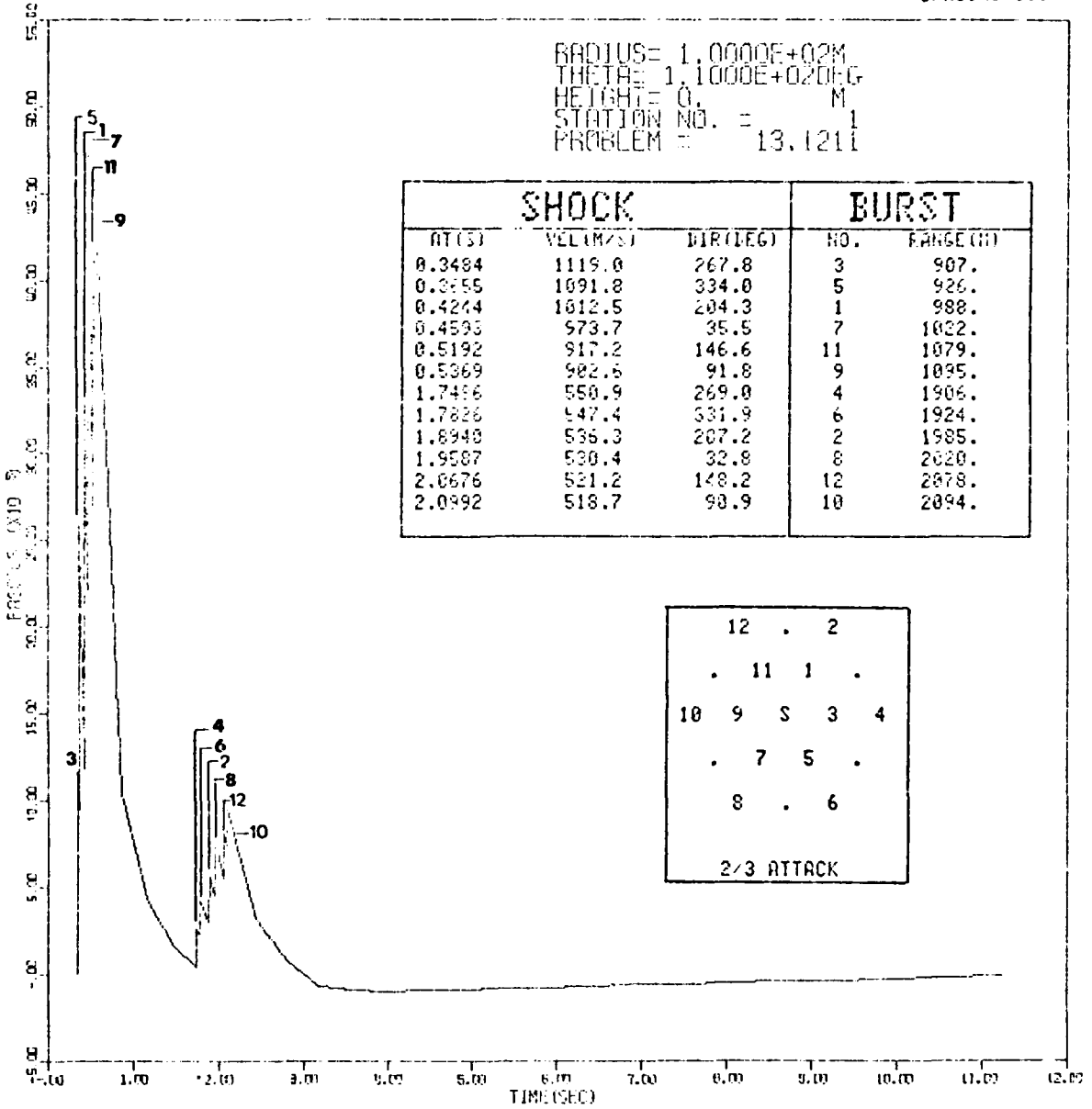
AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6013



AFWL LAMB MODEL CALCULATIONS PROBLEM = 53.6013

HOB= 0m
YIELD= 1Mt
SPACING=1000m

OVERPRESSURE VS. TIME

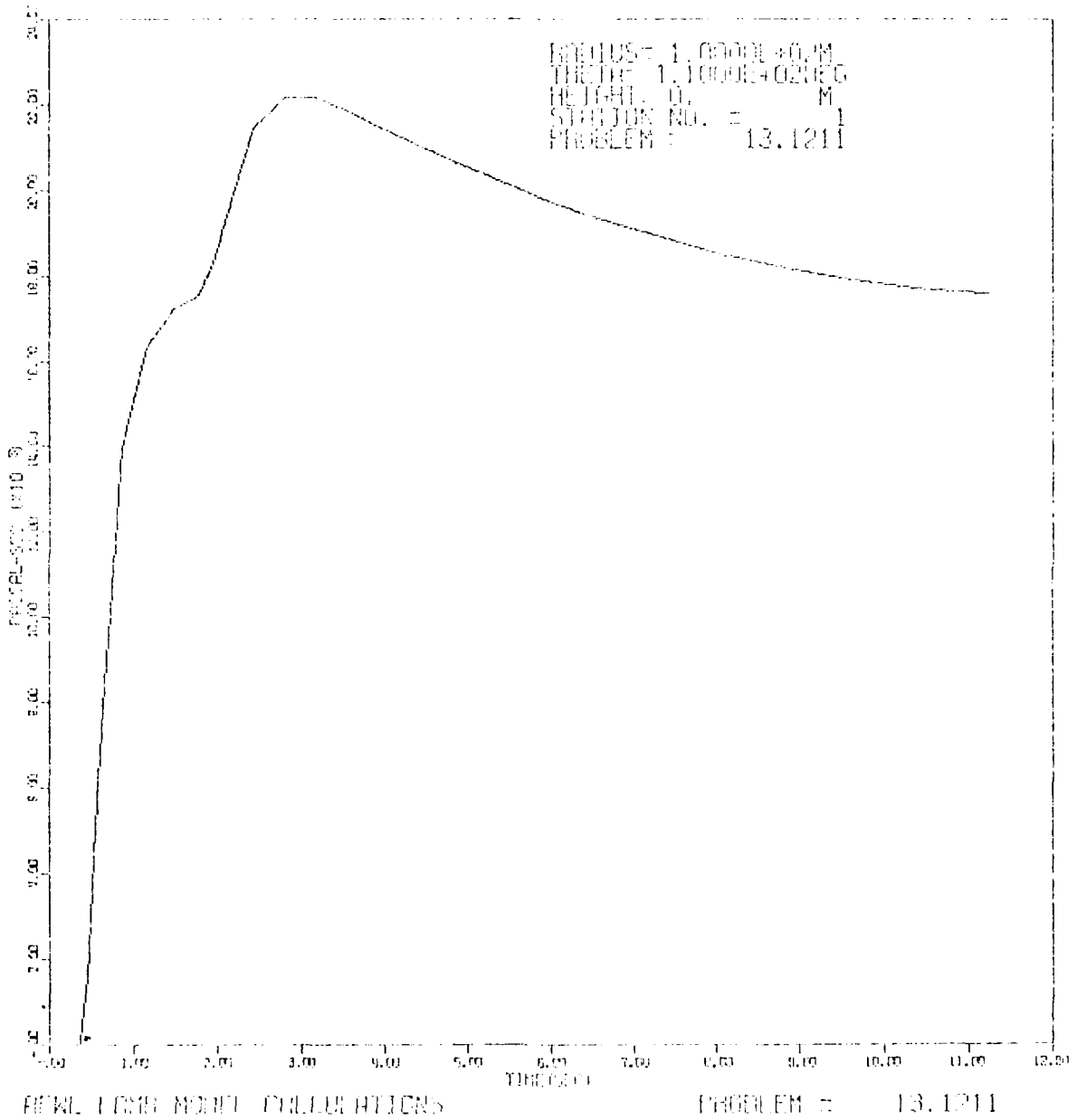


SHOCK			BURST	
AT(S)	VEL(M/S)	DIR(DEG)	NO.	RANGE(M)
0.3484	1119.0	267.8	3	907.
0.3655	1091.8	334.0	5	926.
0.4244	1012.5	204.3	1	988.
0.4593	973.7	35.5	7	1022.
0.5192	917.2	146.6	11	1079.
0.5369	902.6	91.8	9	1095.
1.7496	550.9	269.0	4	1906.
1.7826	547.4	331.9	6	1924.
1.8940	536.3	207.2	2	1985.
1.9587	530.4	32.8	8	2020.
2.0676	521.2	148.2	12	2078.
2.0992	518.7	90.9	10	2094.

		12	.	2
	.	11	1	.
10	9	S	3	4
	.	7	5	.
		8	.	6

2/3 ATTACK

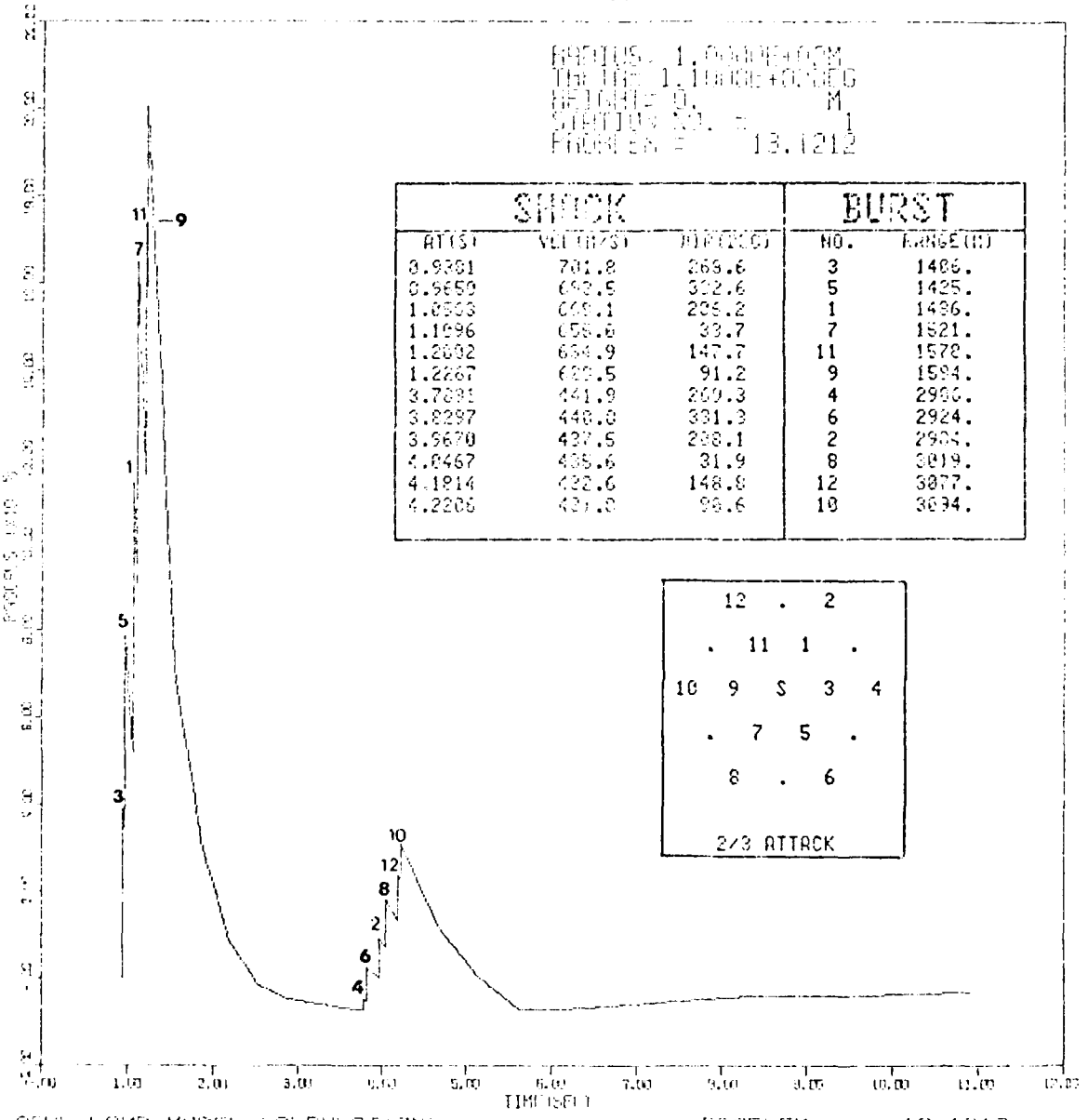
AFWL LAMB MODEL CALCULATIONS PROBLEM = 13.1211


RADIUS= 1.0000E+00M
THETA= 1.0000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 13.1211
TIME(SEC)
PROBLEM = 13.1211

HOB= 0m
YIELD= 1Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

RADIUS= 1.0000E+05M
TANGENT= 1.1000E+00DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM # 13.1212

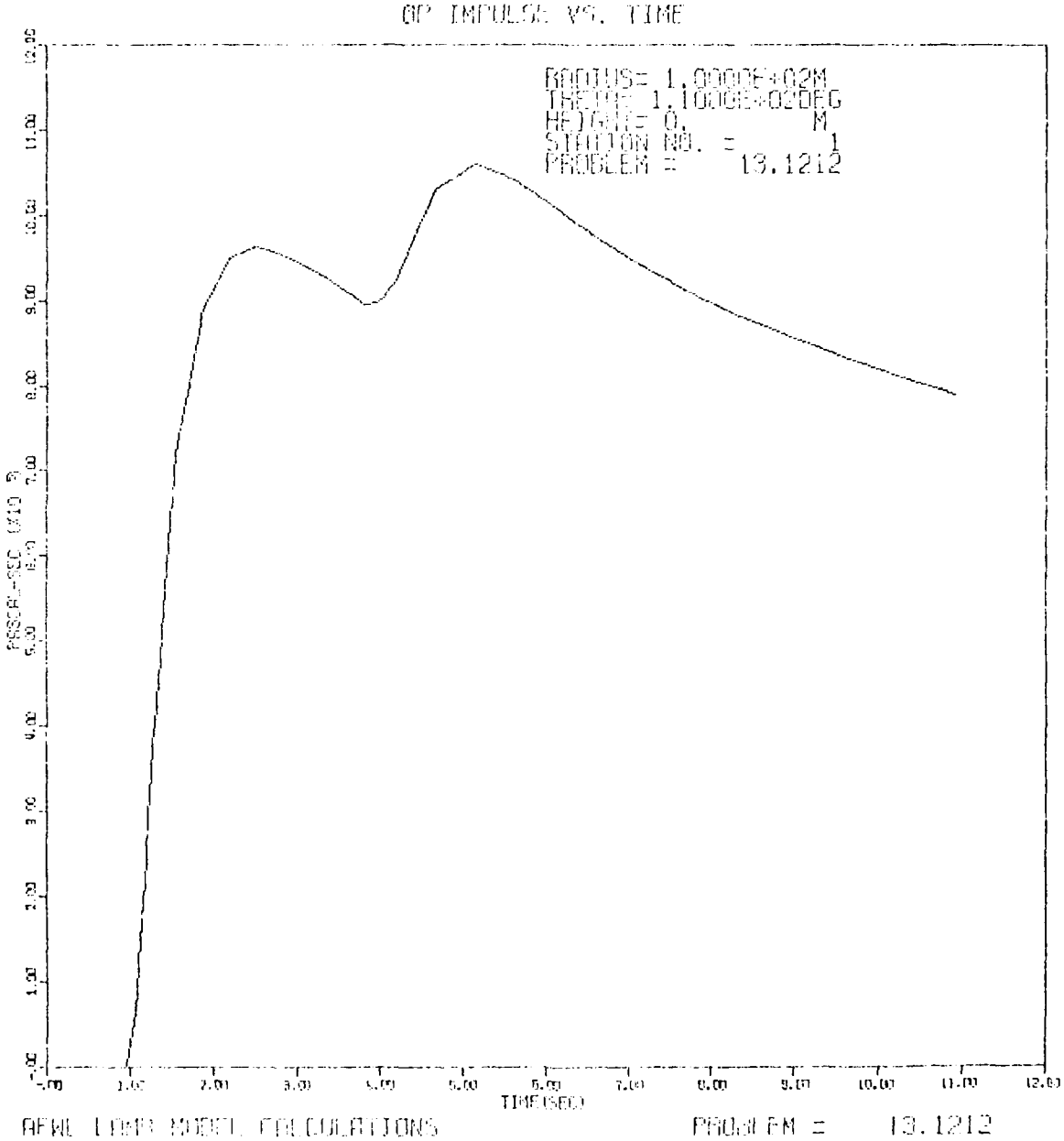


SHOCK			BURST	
ARRIVAL	VELOCITY	DURATION	NO.	RANGE(M)
0.9381	701.8	366.6	3	1406.
0.9659	692.5	332.6	5	1425.
1.0503	669.1	295.2	1	1486.
1.1096	656.6	33.7	7	1521.
1.2092	634.9	147.7	11	1578.
1.2267	631.5	91.2	9	1594.
3.7881	141.9	269.3	4	2966.
3.8297	448.8	331.3	6	2924.
3.9670	437.5	298.1	2	2905.
4.0467	436.6	31.9	8	3019.
4.1814	432.6	148.8	12	3077.
4.2206	431.8	99.6	10	3094.

		12	.	2
	.	11	1	.
10	9	S	3	4
	.	7	5	.
		8	.	6

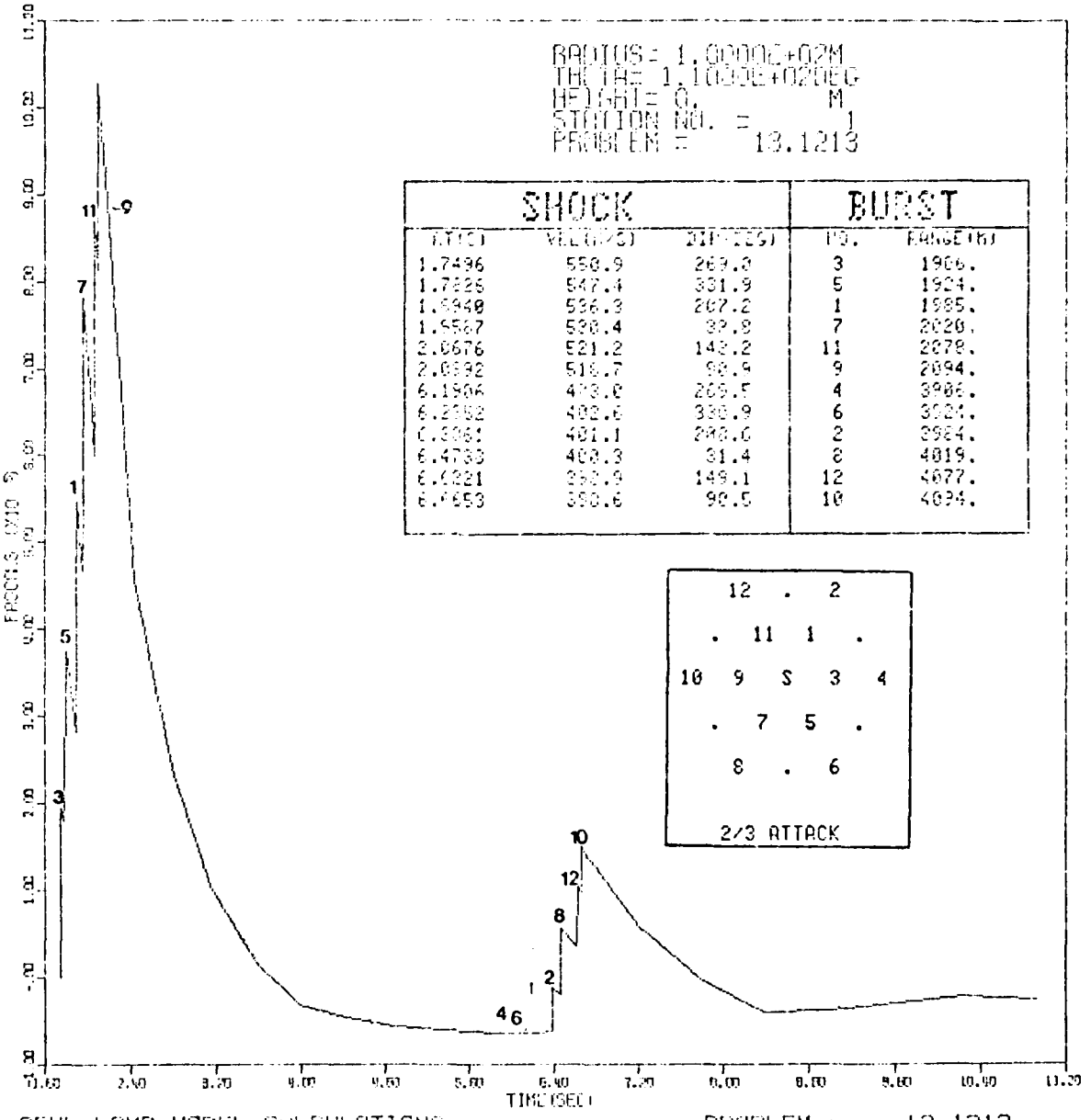
2/3 ATTACK

RAW BOMB MODEL CALCULATIONS PROBLEM # 13.1212

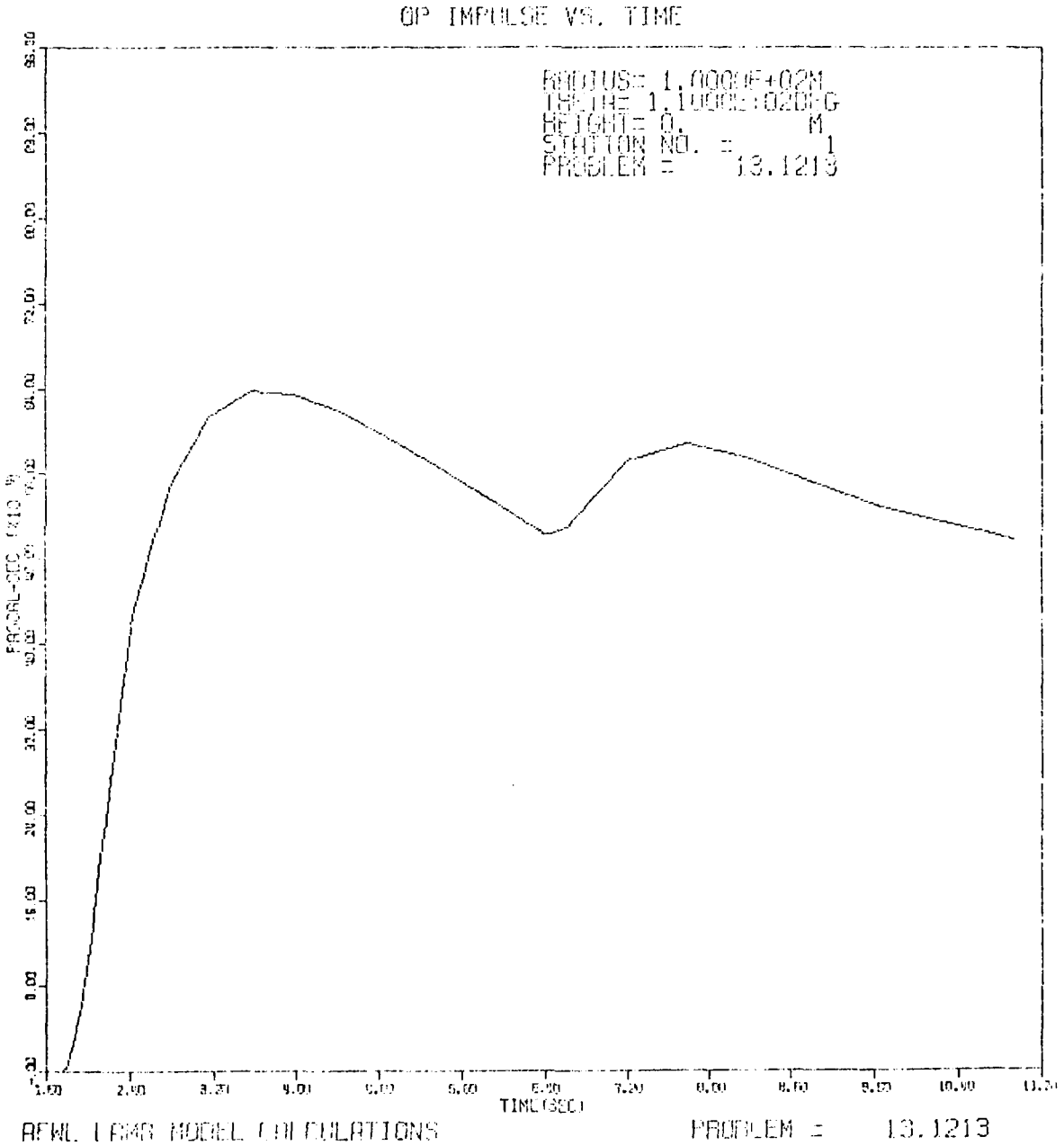

OP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 1.1000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 13.1212
PSSCAL-SEC (X10 E)
TIME(SEC)
AFWL LOAD MODEL CALCULATIONS
PROBLEM = 13.1212

HOB= 0m
YIELD= 1Mt
SPACING= 2000m

OVERPRESSURE VS. TIME



AFWL LAMB MODEL CALCULATIONS PROBLEM = 13.1213



BRL CRAY MODEL CALCULATIONS PROBLEM = 13.1213

HOB= 0m
YIELD= 1Mt
SPACING= 1500m

OVERPRESSURE VS. TIME

RADIUS= 1.0000E+02M
THICKNESS= 2.0000E+02M
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 13.1012

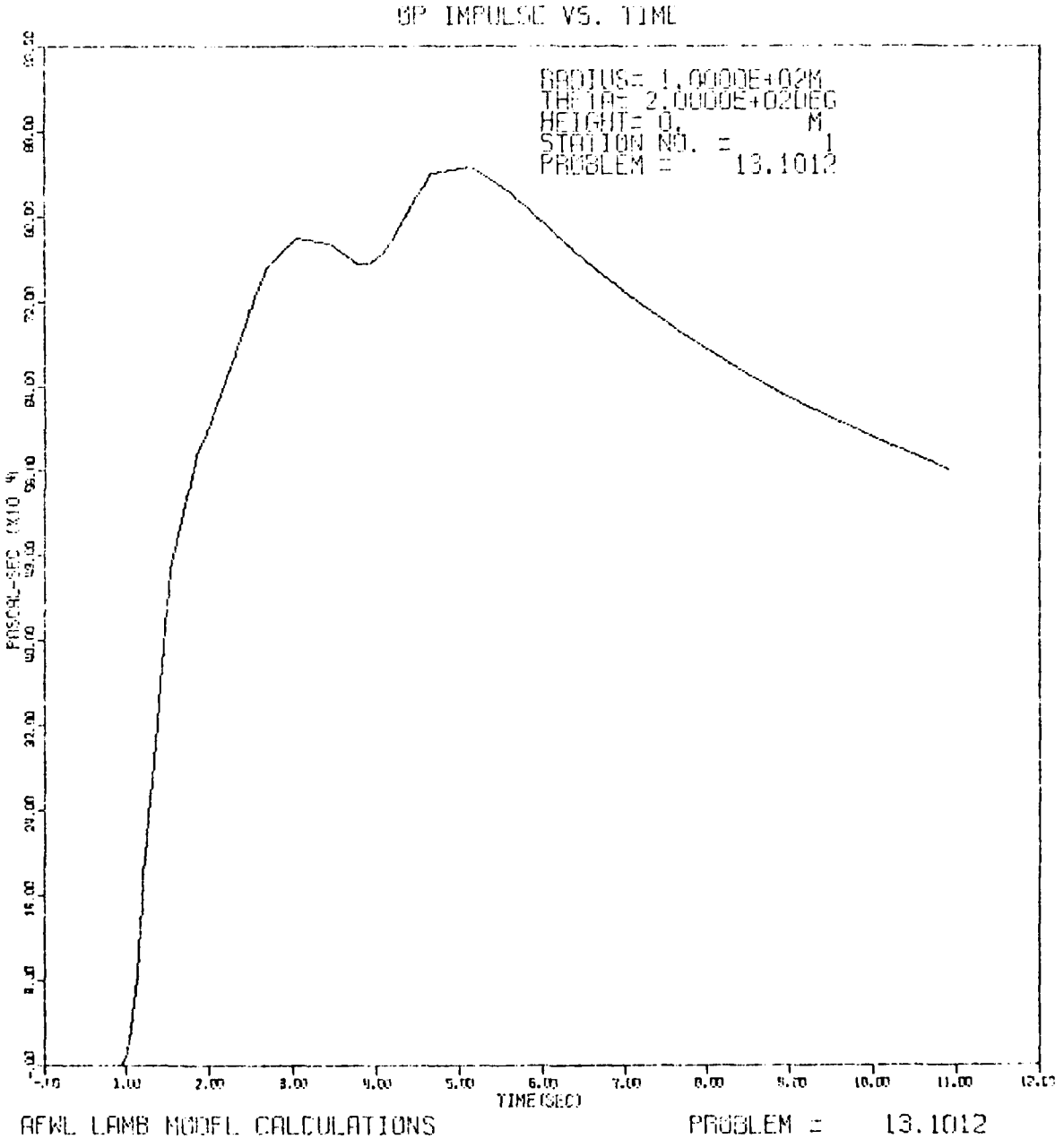
SHOCK			BURST	
RT(S)	[illegible]	[illegible]	NO.	RANGE(M)
0.9931	701.0	358.6	6	1496.
1.0281	675.0	98.7	9	1460.
1.1354	649.0	266.5	4	1537.
1.2267	629.5	181.3	1	1504.
1.9860	528.0	46.2	8	2031.
2.2269	500.4	242.9	3	2212.
3.7991	441.0	359.0	7	2906.
3.9231	436.4	81.6	10	2987.
4.0361	434.7	260.2	5	3035.
4.2285	431.8	164.6	2	3094.

PSOILS (X10 ?)

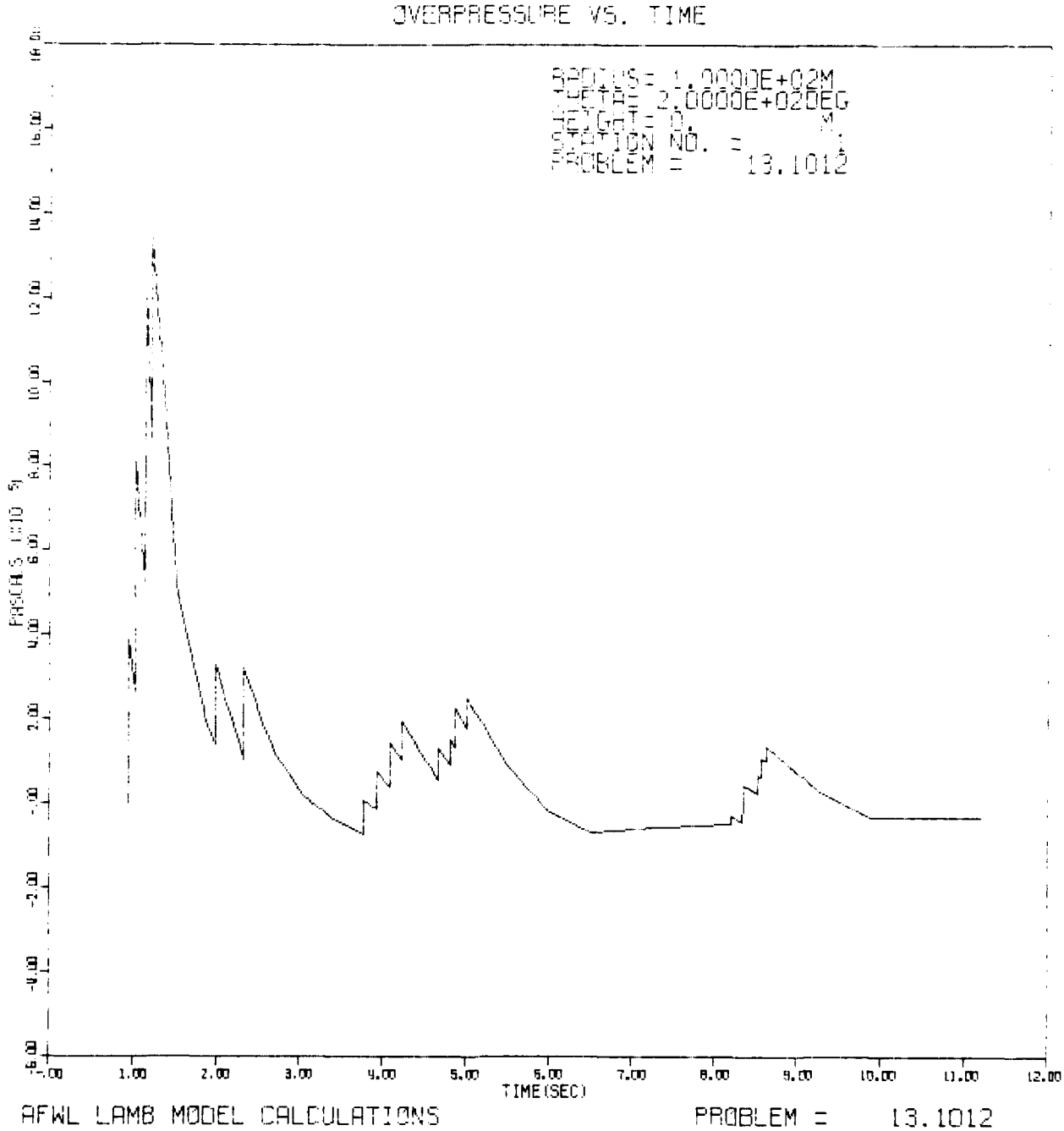
TIME(SEC)

2/3(a) ATTACK

AFWL LAMB MODEL CALCULATIONS PROBLEM = 13.1012

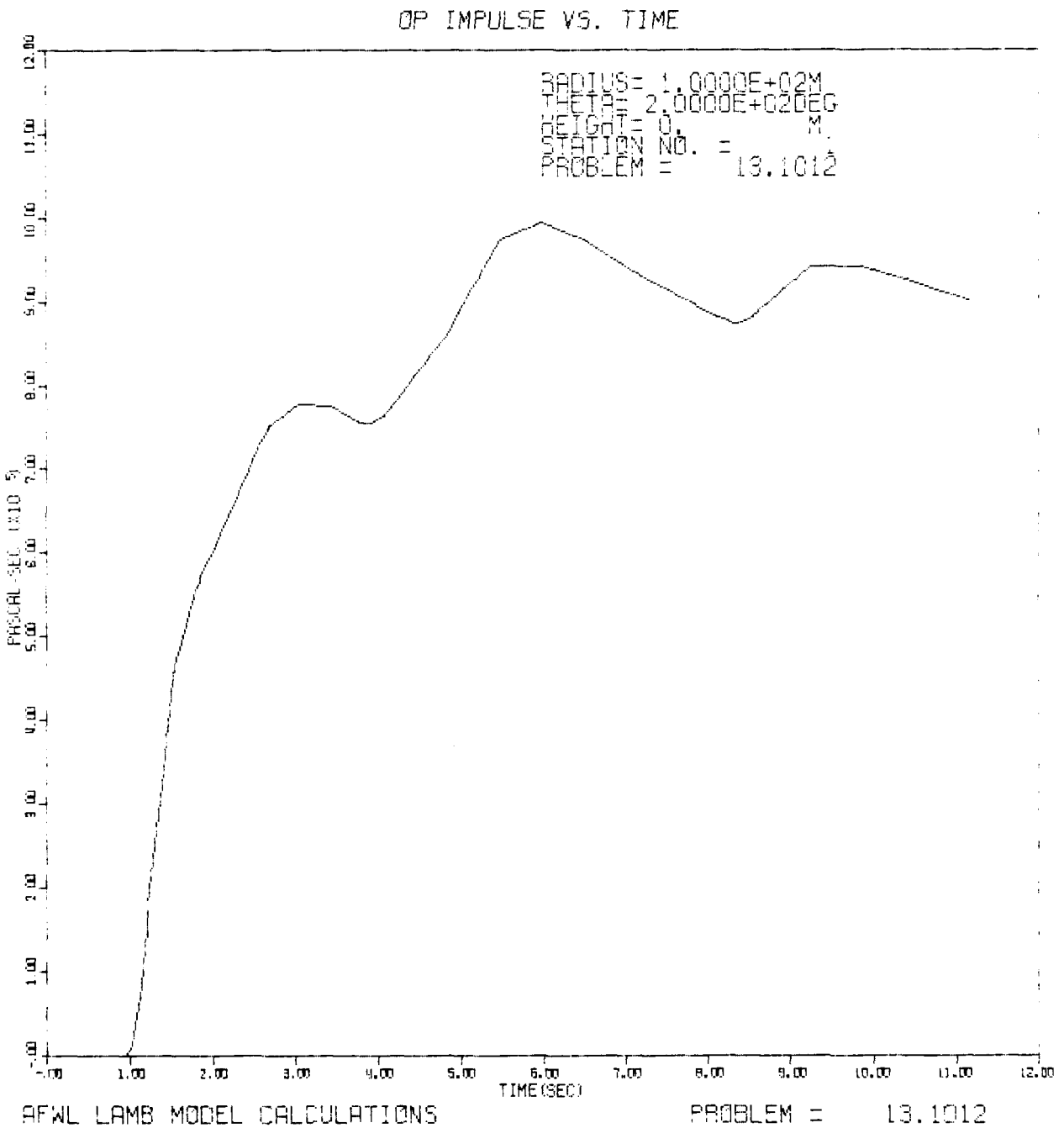

SP IMPULSE VS. TIME
RADIUS= 1.0000E+02M
THETA= 2.0000E+02DEG
HEIGHT= 0. M
STATION NO. = 1
PROBLEM = 13.1012
PASCAL-SEC (X10 4)
TIME(SEC)
AFWL LAMB MODEL CALCULATIONS
PROBLEM = 13.1012

TEST CASE



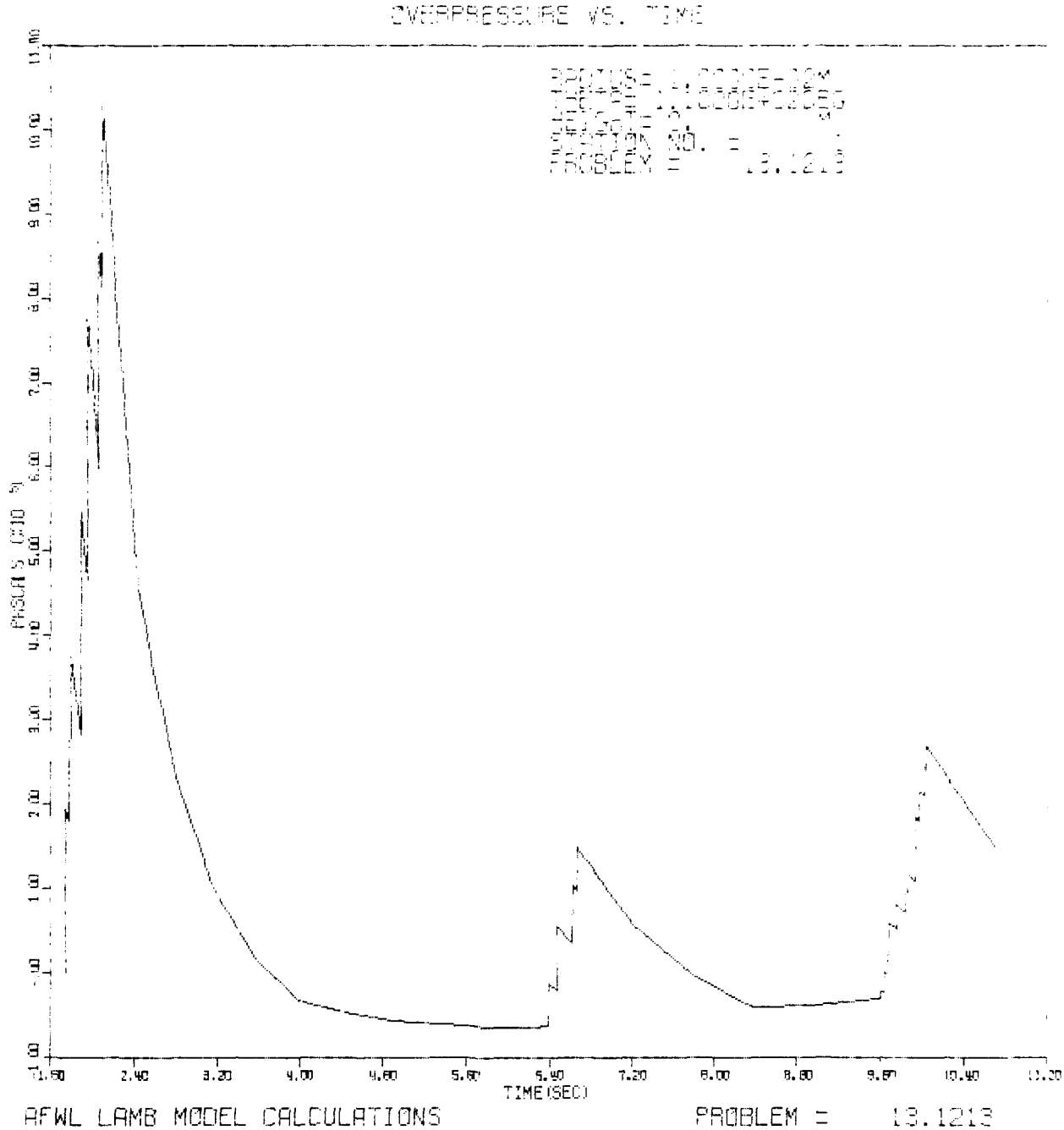
2/3(a) ATTACK (WITH ADDED BURSTS)

TEST CASE



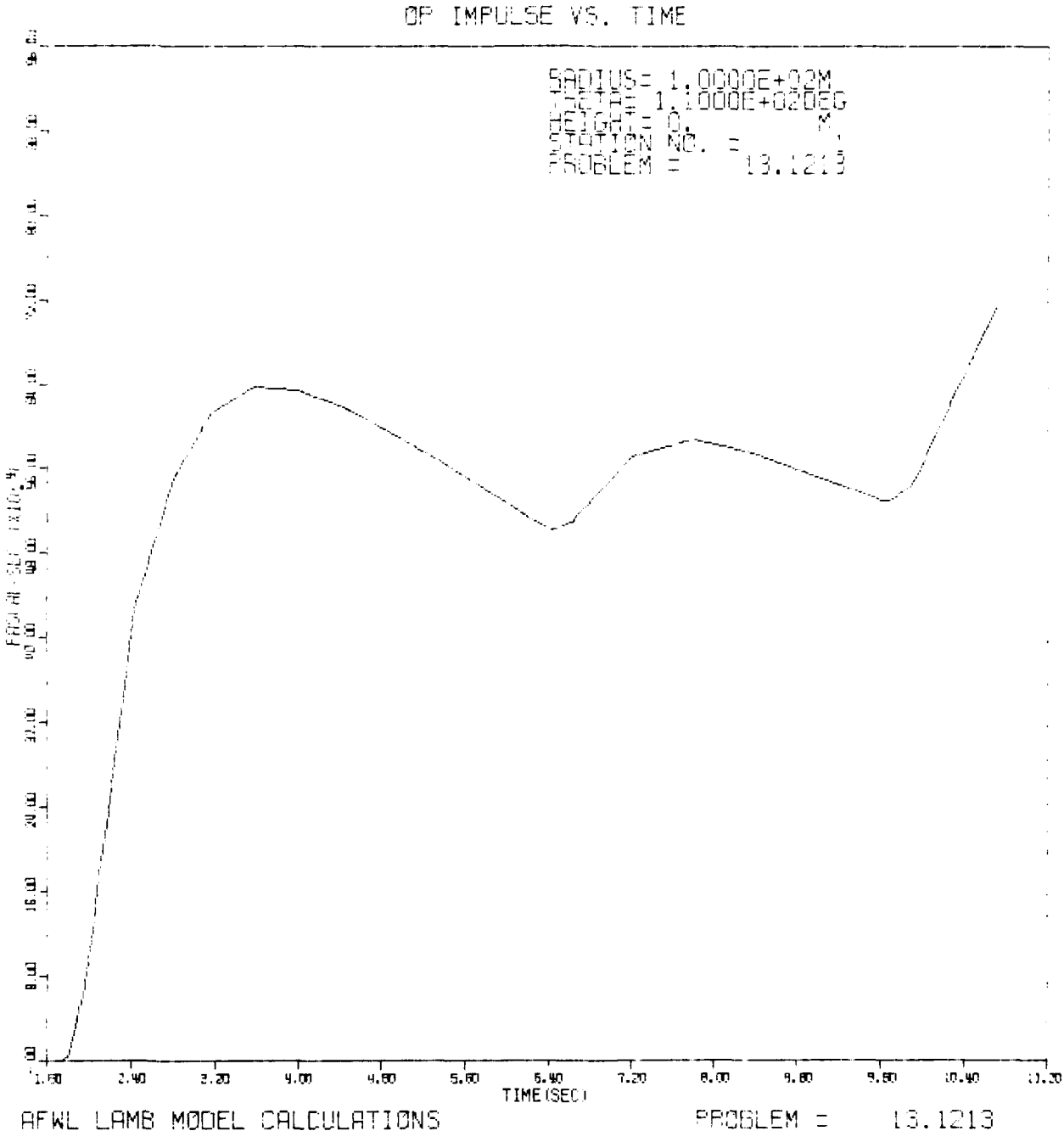
2/3(a) ATTACK (WITH ADDED BURSTS)

TEST CASE



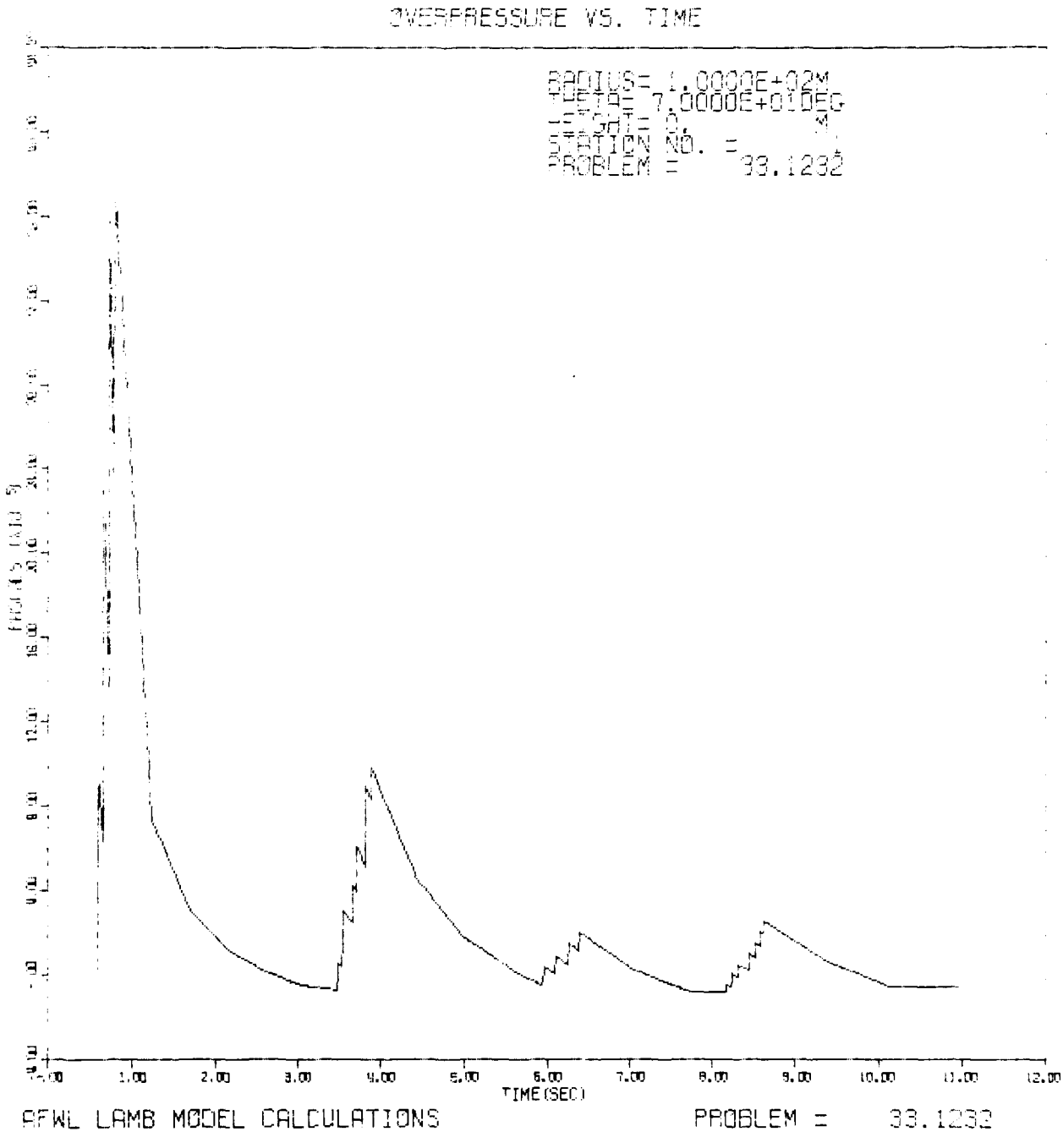
2/3 ATTACK (WITH ADDED BURSTS)

TEST CASE



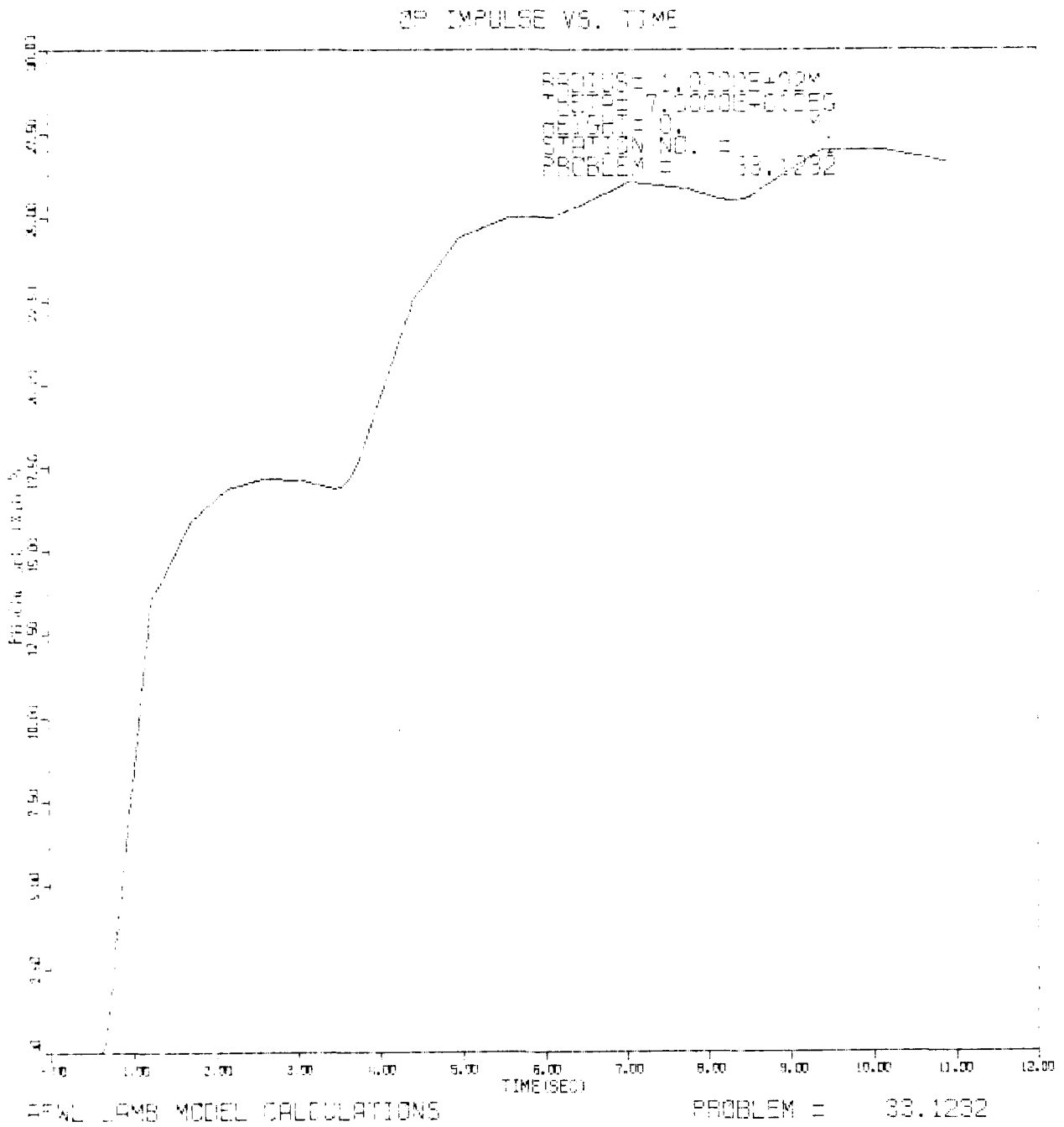
2/3 ATTACK (WITH ADDED BURSTS)

TEST CASE



1/2(c) ATTACK (WITH ADDED BURSTS)

TEST CASE



1/2(c) ATTACK (WITH ADDED BURSTS)

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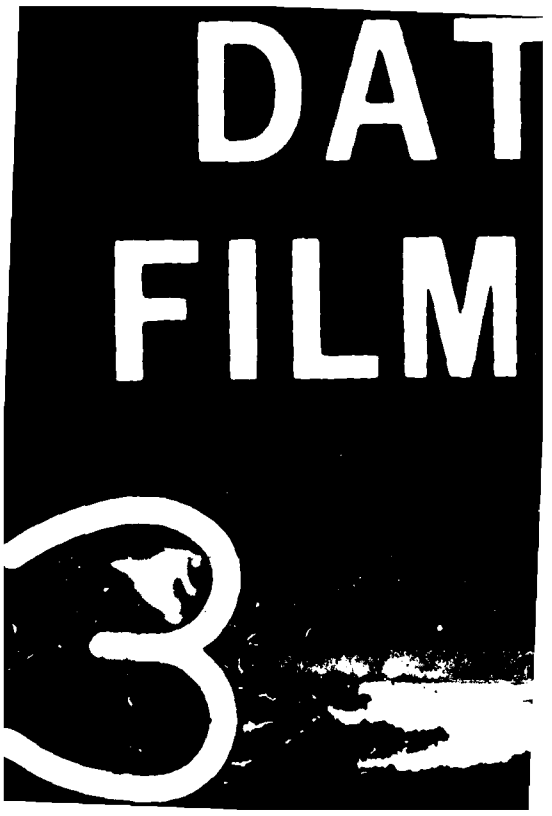
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